BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXV 1893 No. 2

THE FINGER LAKES OF NEW YORK.

BY

ALBERT P. BRIGHAM.

Lakes belong clearly within the domain of what is sometimes called Geographical Geology. Their geographical interest is not small. Their variety in size, from the smallest natural ponds up to inland seas, their diversity in shape, depth and altitude, and their great numbers, are facts which strike the attention and suggest inquiry. From an economic point of view they afford abundant materials for consideration as bearers of traffic, as regulators of floods, as centres of resort, and for their effects upon climate. Studied geologically, lakes open up an important body of facts. Primeval continents could not have progressed far in their growth before lake making conditions began to appear. Viewed individually, lakes are affairs of short life. Geological forces are always making lake basins, and such basins are constantly being destroyed by filling with sediment, or by the cutting down of their rims; or, the basin may remain, while the lake is destroyed

by desiccation. On most competent authority,* the numerous lakes of the Scottish Highlands are but a fraction of what have formerly existed. The variety of forces whose action aids in bringing lakes into being, has suggested the most convenient classification of lakes, that is, according to their origin.† Thus we have a relatively small group of lakes of volcanic origin, occupying old craters or valleys obstructed by lava. More important is the group of orographic lakes, or those due to deformation of the earth's crust. Here belong the lakes of the Great Basin, and, according to some, our Great Lakes, and Champlain. In limestone countries, solution lakes are not uncommon, and this agency has been operative in enlarging many basins, due primarily to other agencies. Landslip lakes have been noticed by Lyell,‡ and Gilbert records the formation of small lakes behind landslip terraces.§ River and shore lagoons must be named in any full classification, while glaciation, in one way or another, is responsible for the existence of most lakes. Here we have the ice-dam or temporary type, as Agassiz and Iroquois, the kettle-hole group, which is often made to include what Geikie calls "Lakes of the Plains,"‖ and which he defines as lakes that "lie in hollows of the covering of detritus left on the surface of country when the ice-sheets and icebergs retreated." Thus they differ from

* Geikie, Scenery of Scotland, p. 241.

† See "Classification of Lake Basins" by Prof. W. M. Davis, Proc. Boston Soc. Nat. Hist., Vol. XXI., 1882, p. 321. The several kinds are ranged under the general heads, "Constructive," "Destructive," "Obstructive."

‡ Principles of Geology, II., p. 129, 11th ed.

§ Lake Bonneville, pp. 83, 84.

‖ Scenery of Scotland, p. 227.

the kettle-hole ponds, which are thought to have frequently originated by the sliding of debris from stranded bergs or ice masses isolated by retreat of the main sheet. Other glacial lakes are due to morainic dams in valleys, and yet others, beyond dispute, as it seems to me, are in whole or in part, rock basins, due to glacial excavation. The lakes by morainic dams and by excavation introduce us to those lakes of New York, which will have chief attention in this paper.

For convenience, we may regard the lakes of the State as comprised in three groups: first, the Great Lakes, Erie and Ontario, to which we may add Champlain. Second, the Adirondack Lakes. Disposed, at first sight, in extreme disorder, any map will, on scrutiny, disclose a measure of system, a prevailing northeast by southwest range, suggesting an orographic origin of the mountain valleys in which they lie, though glacial forces have doubtless mainly originated their basins. These lakes offer some sharp contrasts with those later to be considered, as in their irregularity of form, the boldness of the surrounding topography, the greater amount of lake filling, and their relatively great altitude, ranging from 1500 to more than 4000 feet above the sea level.

We shall now undertake some study of the third great group of our larger lakes, the north and south lakes lying between the Ontario-Mohawk depression and the southern tier of counties. We may regard the region as a unit or single plateau, extending from the Catskill Mountains to the Genesee River, a plateau whose summits are about 2000 feet above the sea level, and whose general surface is much of it above 1000

feet. Or we may, better for our present purpose, consider the tract as composed of two inclines, one sloping northward to Lake Ontario and the Mohawk River, and the other southward, bearing the head-waters of the Chemung-Susquehanna. Upon both faces of this east and west ridge or plateau, and continuing across the divide, is found that remarkable series of valleys, whose history is essentially the history of the lakes in question. These valleys, owing to their number and uniformity, have attracted attention ever since the topography of the Empire State began to be studied. Vanuxem, in his volume of the final report on the geology of New York, takes up the problem, and well illustrates the struggle which good and trained observers had, fifty years ago, in their effort to reduce refractory facts to order, without the help of ice.*

If we begin at the east and go to the western limit of the State, we may call the lakes the Otsego-Chautauqua series, or we may limit our view to those lying between Otisco and the Genesee River, and then we shall have the Otisco-Conesus group, or, as commonly known, the Finger Lakes of New York.

Concerning these latter the principal topographic facts are as follows. They lie on the northern slope of the plateau, or in the hydrographic basin of Lake Ontario. From Otisco to Canandaigua they have a concentric trend northward, and to this series Onondaga and Oneida may be added, whatever may be said of the

* See Geology of Third District, pp. 235–238 where, at the close of his discussion, Vanuxem says: "Patient investigation, in time, if true, will harmonize their results; for truths only apparently conflict with each other, the real conflict being solely in the minds of those occupied with them."

genesis of the latter lakes. All these have their outlet through the Seneca and Oswego rivers, while Honeoye, Canadice, Hemlock and Conesus trend slightly west of north and send their waters to the Genesee. It is at least suggestive that the little Silver Lake west of the Genesee trends north-eastward, and likewise finds an outlet to the same river. The recency of these outlets is perfectly evident, whether flowing sluggishly out on the surface of the drift, as in the case of Cayuga, or having cut shallow cañons for part of their course, as in the case of more elevated lakes like Silver or Skaneateles. In length the lakes vary from three or four miles, as Silver and Canadice, to about fifteen in the case of Canandaigua and Skaneateles, and to above thirty for Seneca and Cayuga. The latter two show a maximum width of over three miles. The greatest depth of Seneca is 618 feet, and of Cayuga 435 feet. The deepest parts of Keuka measure about 175 feet, of Skaneateles, 275 feet, and of Canandaigua, 240 feet. As to altitude, it increases almost uniformly as the size of the lakes decreases, from Cayuga at 378, to Canadice at 1099.

Closely related to the lake basins are the intervening ridges, which rise from an almost undifferentiated plain at the north to bold swells at the south, having, from a distance, an extremely uniform appearance, and rolling down to the surface of the lakes like arcs of great cylinders. Sometimes the tops and upper flanks of these ridges are diversified by long, gentle, drumloidal swells, telling unerringly the story of glacial moulding.

Cutting down across the lower flanks are innumer-

able ravines, entering the lake basins at right angles, and lining off the open farm-lands with parallel strips of forest. The map published by the engineering department of Cornell University records 223 of these lateral streams entering Cayuga lake, of which but 13 enter the northern third, a most instructive fact in tracing the topographic development of the region. South of the lake region, about coincident with the line of hill summits and the water parting of the valleys, is the terminal moraine of the second glaciation, another important fact as regards the history of the excavations. The lake belt may be said to join the flat, milder and richer northern regions of western New York, with the high, cold and poorer uplands of many of its southern counties.

All the larger lakes, except Keuka, have their northern terminus in or near the Helderberg zone of rocks, while their southern ends are commonly in the Upper Devonian sandstones. Much of the soil at the north, therefore, is debris of the Niagara, Salina and Helderberg rocks, which, compared with Hamilton and Portage soils and the increase in altitude, readily explain the economic diversity of the northern and southern counties. About the lakes and upon their ascending hillsides the lakes act as reservoirs of heat to delay the autumn frosts, and so combine with conditions of soil to favor the fruit industries of Keuka and other lakes. The scenery of these lakes demands at least a passing notice, and would amply reward the attention of the student or the tourist. Never bold, save in some of the cañons like Watkins, it yet should not be overlooked or despised because it is so accessible,

and surely not by those who share the writer's enthusiasm for the varied resources and beauty of the Empire State.

We shall come now to some considerations bearing on the genesis and history of these basins. Some of the facts to be accounted for are as follows:—What is the origin of the north and south valleys? Why do the Finger Lake valleys have a concentric trend? What has transformed parts of the valleys into depressions capable of holding water? Why do they lie in an east and west series, in rocks of the same horizons and terminating northward on about the same parallel? Why do they occur in such numbers in western New York, and have a limited development farther east? Why do the lakes narrow and at the same time deepen toward their southern ends? The last consideration is worthy of further note before we proceed. The average of a line of cross soundings one mile from the north end of Skaneateles Lake is 34 feet, one mile from the south end is 106 feet. For the north end of Canandaigua Lake we have 17 feet, for the south end 164 feet. Similar averages for the larger lakes four miles from either end give for Cayuga 11 feet at the north and 275 feet at the south; for Seneca 149 feet at the north and 400 feet at the south. The meaning of these facts will be discussed further on.

We naturally divide the history into three chapters and inquire how much of the physical evolution of this region is pre-glacial, how much is glacial and interglacial, and what features are post-glacial.

The pre-glacial development of topography carries us so far back that we are compelled to speculate rather

than arrive at conclusions. Granted the initiation of the Laurentian depression, probably by orographic movement, and we have the beginnings of an erosion which would in time strip off the upper Paleozoic beds, consume and bevel off their northern outcrops, and give us an approach to the incline which slopes off into Lake Ontario. Just where this long erosion left the line of water partings we cannot tell. And how far the cols were developed which now unite the valleys across the ridge, is a question which students will answer according to their belief or non-belief in the digging power of glaciers. My own impression is that the opposing Susquehanna and Laurentian stream systems had worked back upon each other until their head waters were thoroughly interlocked, and had in many cases merged into each other, forming cols which should afterward be vigorously rimmed out by ice streams.

If we inquire as to the form of these pre-glacial valleys, we naturally refer to a non-glaciated area for light upon the question. Here we learn that when a stream has nearly or quite reached its base level, it begins to wander from side to side, giving rise to flat-bottomed valleys, often bordered by lines of cliff, formed by under cutting and removal of the talus.*

The Finger Lakes in cross section often give evidence of such old flat-bottomed valleys, whose profiles have not been destroyed even by important glacial excavation. Soundings of 150 to 300 feet are not very uncommon within 500 feet of the shore of the larger lakes, offering a natural extension of the sharply de-

* See "Driftless Area of the Upper Mississippi Valley," Chamberlin and Salisbury, 6th Annual Report U. S. Geol. Surv., pp. 225–228.

scending slopes above the water's edge, which are characteristic of the southern half of the lakes. I believe that Seneca, Cayuga, and the Genesee mark such deep, broad-channelled, pre-glacial trenches. Thus the present altitude of Cayuga Lake is 378 feet. The level of the old valley was probably lower, owing to drift filling at the north, though this might be offset by glacial erosion. The altitude of Seneca is 441 feet, while the old valley was probably quite as deeply cut as that of Cayuga. Compare the Genesee, whose alluvial bottoms are but 595 feet above tide at Mt. Morris, which is fully forty miles from Lake Ontario. The remaining and important question as to pre-glacial topography relates to the direction of the streams, which many have held to have discharged southward into the Susquehanna system. I believe the facts to be almost wholly opposed to this view, and shall give my reasons in discussing the glacial history. I am, however, prepared to believe that the locus of the watershed has been slightly shifted southwards. It is natural to think that a heavy mass of ice would grind powerfully on the stoss side (if I may use the word in this way) of a ridge crossing its track, and push the materials over, causing the crest to migrate in the direction of the flow.

We turn to the glacial chapter in this history. I ask you to keep in mind the conditions which a long pre-glacial development had wrought—a northward slope as at present, creased by important valleys, bearing streams northward into the pre-glacial representative of Lake Ontario, be it river or lake. Remember that we have a country free from drift, without foreign

bowlders, with soils mainly of the class known as residual, or products of rocks decaying in place.

What changes did the ice work upon such a surface? To anticipate, we may say that the ice brought it nearly to its present form, for the aggregate of post-glacial modification, though highly interesting, is not extensive. My conviction as to the amount of glacial change is, that it was extensive, but not revolutionary. Such change, it is well understood, is capable of discrimination into two elements, sculpture and modelling, carving of consolidated rock, and moulding of loose materials. The Finger Lake country illustrates both phases of glacial work to perfection. The obliteration of the valleys northward, and the gathering up of the several outflowing streams into the sluggish Seneca River, would of itself be sufficient evidence of a glacial filling which had erased the features of pre-glacial drainage, while the smoothed contours and drumlin swells of the ridges which lie between the lakes prove with equal certainty that ice is something more than a soft brush, gently grazing the face of a country.

South of the lakes and about coincident with the line of water partings, runs the moraine of the Second Glacial Epoch. The relative position of this moraine and of the lakes appears to be an important fact, as I shall show, in the genesis of the basins. That the moraine deeply clogged the valleys of streams which once flowed southward, and created basins of the morainic dam type, is a theory to which I think the following facts are fatal. First:—The general and pronounced slope of the country toward the north. I can form no conception of a region whose general slope is

in one direction, and whose main streams are in another. Base level is first attained about the lower course of streams and slowly recedes to the neighborhood of their sources. We have no evidence of such excessive oscillation as would be needed to change the attitude of the district, and that the slope has been reversed by glacial erosion of more than 1000 feet of rock, from the neighborhood of Geneva and Auburn, is a proposition which few would care to accept.

Second:—The vast glacial filling required in the valleys south of the lakes, if they are to be held in place by morainic dams. Thus Pine Valley, the point of divide south of Havana, is 865 feet above tide. The deepest recorded sounding of Seneca Lake marks 177 feet below tide. Professor Chamberlin does not express a judgment in the matter, but quotes the commonly held opinion of an original southern flow, and then says: "If this be true, and no allowance be made, on the one hand, for drift deposits in the bottom of the lake, nor, on the other, for glacial corrasion, the total depth of the drift under the crest of the moraine must exceed 1000 feet, and this depth, approximately, must continue far down the Chemung-Susquehanna valley." *

The same is true of Cayuga, if its channel was dug by a south-flowing stream. Essentially the same is true of Owasco and Skaneateles, for although less deep, the water partings to the south are higher. Those who can, may believe that a series of valleys is blocked by 1000 feet of loose materials along the line of a moraine, which, though massive, is not massive enough to make a strong showing across the intervening ranges of hills.

* Third Annual Report U. S. Geol. Surv., p. 355.

Third :—The lakes quite uniformly open out to greater widths northward. Cayuga Lake at Ithaca is a little over one mile wide, heading between high, strong walls. At Aurora it occupies a broad, shallow basin, and is above three miles in width. The same figures will serve for Seneca at Watkins and Dresden ; while at Havana (three miles south of the lake) the width of the valley is less than a mile. Moreover, if these lakes are held in by morainic dams at the south, there ought to be signs of morainic topography in the lake bottoms and about Ithaca and Watkins, and no possible amount of post-glacial lake filling could have so thoroughly effaced it. We may, therefore, dismiss the notion of southward flow and valley-filling and seek a theory of the lakes more accordant with the topography.

Setting aside dislocations and solution, we have either buried pre-glacial channels to the north, or glacial excavation, or both, as legitimate hypotheses. Let us test them, and see first how far the theory of drift-clogged channels at the north will help us.

Take Skaneateles Lake. Its surface is 861 feet above the sea. Its greatest depth is nearly 300 feet. Its outlet runs through the village of Skaneateles and for nearly a mile northward runs practically on the surface of the boulder clay. At the Lake, the Syracuse water engineers have excavated to a depth of 20 feet, half in made soil, half in undisturbed till, with no sign of rock bottom. But between one and two miles north the outlet in its rapid descent has cut through the till into the Marcellus shale. The amount of drift barrier at the north end of Skaneateles Lake is less than 50 feet. Over 200 feet of the present depth of

the lake, therefore, appear to lie in a rock basin, for there is no evidence of a buried channel. The old preglacial stream must have had about the present course.

We will apply the same test to Owasco Lake. This sheet of water is ten miles long. The city of Auburn is situated in the valley of its outlet two miles from the foot of the Lake. Here again the outlet passes over the surface of the drift for some distance, then passes gradually into a gentle sag, and one mile from the lake has made a channel 25 feet deep, with till cliffs having the usual angle of 30° or 35°. In the south part of Auburn the till cliffs are 50 to 60 feet high, and then the stream passes the railway depots and the State prison on a rock floor of jointed limestone blocks. The evidence here also is against the existence of a buried channel. I am not informed as to the depth of Owasco Lake, but whatever it be, only from 50 to 60 feet of it is due to drift blockade, and for the rest, the rock-basin theory must mainly account.

For Cayuga Lake we have no data. The altitude drops to 378 feet, or but 131 feet above Lake Ontario. The country about the north end is flat, and the outlet passes sluggishly out through the Montezuma marshes. From the general importance of the Cayuga valley and its approach to a local base level, as well as from buried channels at Syracuse and Geneva, I infer that much of the depth of Cayuga Lake—one-half or more—is due to drift barrier, not of the morainic sort, but a plastering full of the ancient channel.

For Seneca Lake we have the case more clearly before us. Hall notes* the absence of outcrop of the

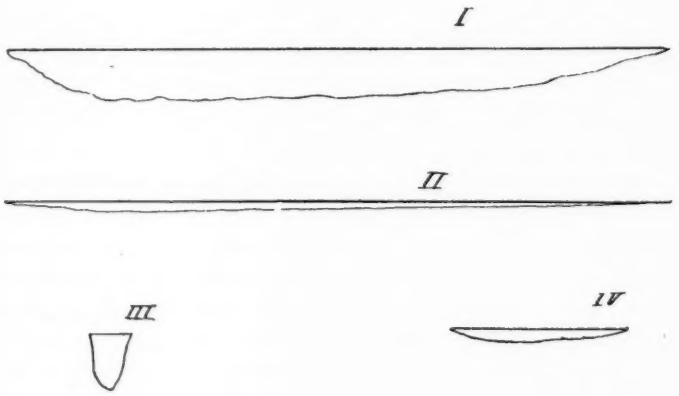
* Geology of the Fourth District, p. 164.

Corniferous limestone for several miles east and west of Geneva, and suggests that the valley of Seneca Lake once extended farther north than at present. We have also present information of a boring at Geneva, in which rock was reached at a depth of 240 feet below the surface of Seneca Lake.* If this marks the maximum depth of the old erosion, we still have 378 feet of the depth of Seneca Lake to be accounted for.

Here we have a residue of depth, plus a certain unknown but probably small thickness of bottom sediments, for which glacial excavation is the most satisfactory explanation. This is not the place to argue the digging power of glaciers. I do not urge it upon any who, like a recent rather severe critic of the United States Geological Survey, are ready to confess that the glacial period "is a fiction." Nor do I ask for a glacial erosion adequate to scoop out such basins as those of Ontario or Michigan, which, however, I do not deny. Rather do we seem driven to postulate ice work sufficient to change a well-deepened stream valley into a basin whose depth is, after all, very slight when we consider its superficial extent. Sceptics are apt to be merry at the expense of believers in rock basins by ice; they are "great believers in soft places," etc. How can ice scoop debris out of a pit hundreds of feet deep, they say. Such objection arises largely from that exaggeration of the vertical scale which we are so slow to outgrow, in delineating elevations and depressions, as mountains and sea bottoms. I give an illustration in the following diagrams. Fig. 1, drawn in the same

*Glaciation in the Finger Lake Region of New York, by D. F. Lincoln, Am. Jour. Sci., Oct., 1892, p. 301.

proportion as the longitudinal section of Seneca Lake upon the Cornell University Engineering Department map,* would give the lake a depth of between three and four miles. Fig. 2 is still so much exaggerated in vertical scale as to give the lake a depth of 3000 feet. A section could be drawn true to scale by swelling slightly the under side of a straight line. Fig. 3 is a



cross section of Seneca Lake in its deepest part, as shown upon the Cornell map, while Fig. 4 gives the actual cross-section. It will be seen, therefore, that we do not require the ice to rise out of a steep-walled pit, with its load of debris, but that the amount of scoop is relatively very slight.

---

* A method which engineers find it needful to use, but which geologists and geographers should discard when possible.

If it still seems too much to ask an erosion of 200 to 300 feet, it is possible that a further consideration may have some bearing, viz., crust oscillation. Recovery from northern depression would have some tendency to deepen the basins, especially toward their southern ends, which is precisely where our demand for cause is the heaviest. Professor Shaler has suggested that such a movement may have developed the marsh lands already spoken of as extending from the foot of Cayuga Lake.*

I propose now to inquire whether the outline of history given is accordant with certain further facts, and whether in any measure it answers the queries already set forth. To review briefly, we suppose the basins to be a composite resultant of valley erosion, glacial scoop and drift barriers, with perhaps a slight element of orography.

One of the problems presented is the deepening of the lakes southward. As above indicated, I cannot consider this as due to pre-glacial southward flow. Narrowing of the ice between contracting valley walls increased the vertical pressure and hence intensified the erosion. For this law of glacial action we have so good an authority as Geikie.† Again, the deepest part of the lakes is not far behind the terminal moraine, and was therefore for a long time the seat of severe ice action. On this phase of the case I find the following summary of the view of Böhm on "Die Hochseen der Ostalpen."‡ "The Alpine lakes are divided into two

* Tenth Annual Report, U. S. Geol. Surv., p. 266.
† See "Scenery of Scotland," p. 232.
‡ Am. Jour. Sci., 3d Series, vol. xxxiii., p. 431.

groups, the valley and the mountain lakes. The former are in general large and occupy the valley on the circumference of the former glacial region, where the ice streams at the time of maximum glaciation could exert their greatest force." This is precisely the attitude of the Finger Lakes in relation to the moraine. It may be noted that Otsego and Schuyler are likewise north of a somewhat morainic belt. Added to the above considerations is the fact of southward dip of the beds out of which the basins have been dug, and the further fact that the beds (Marcellus and Hamilton) are relatively soft, as compared with the limestone below, and the massive sandstones above and southward. The deepest lakes were made by the heaviest and most persistent ice streams of the larger valleys. It must be said here, however, that we are not prepared to answer the query, why lakes in some valleys and not in others, as for example the Genesee, which marks a deep pre-glacial furrow, and whose valley must have been the scene of vigorous glaciation. The relation to the moraine determined in part the east and west arrangement of the series. It seems to have been further determined at the north by the resistant horizon of the Helderberg, upper and lower, which the ice could not breach, except as pre-glacial rivers had sawed it in two, as at Cayuga and Geneva. The high, massive upper Devonian sandstones probably also in some measure combined with the limit of glaciation in determining the southward extension of the lakes. The preponderant number of lakes in Western over Eastern New York may be accounted for by the existence of the Ontario depression, the consequent heavier ice flow, than across

the Adirondacks and the Mohawk valley,* and the existence of a wide northern slope between the Ontario sag and the Ontario-Chemung watershed.

Does the topography accord with our medium estimate of the amount of glacial work? The view held is that the topography has been modified but not revolutionized by ice, that the northern slope, the valleys and ridges were pre-glacial, and that valleys were deepened, ridges rounded, and some transverse valleys filled by ice. If corrasion was not excessive, pre-glacial tributary valleys should, in cases, appear. The depression from Penn Yan to Dresden is such a pre-glacial tributary to the Seneca valley, moderately mantled with till, through which and into the underlying rocks the outlet of Keuka Lake has cut in moderate degree. Most of the larger pre-glacial tributaries may also be supposed to have entered to the northward, where the country was well progressed toward base-level, and whose lower courses may now be concealed by drift.

The questions relating to the post-glacial history are more easily answered. As with other recent history, there has been less time for the complication of causes and results, and the features in question stand out sharp and unmistakable.

The recency of the outlets is marked. As already described, the outlets of Skaneateles and Owasco have not yet had time to cut back through two miles of till with a thickness of 50 feet. They flow out over the

* Note the following law, stated by Prof. R. D. Salisbury, Geol. Surv. of N. J., An. Rep., 1891, p. 58: "The depth of moving ice is one of the determinants of its velocity, and because of the greater depths of ice in valleys its motion here was most rapid, and its abrading action powerful."

surface of the drift as if they had started but yesterday. The same is true of the outlet of Seneca, above Seneca Falls, while at Penn Yan it is very plain that the water has backed up through the shallow eastern arm of Keuka Lake and found its way over the drift into an old valley running eastward.

Hundreds of ravines mark courses of small streams entering the lakes, efforts to perfect a new system of drainage for the intervening regions. In some cases fifteen or twenty to the mile can be counted along the steeper borders of the lakes. Watkins' Glen is the best known of these post-glacial cañons, although it enters upon the main valley a short distance above the head of Seneca Lake, but not, however, above the original extension of the lacustrine area. Three miles to the south on the same or west side is Havana Glen. Upon the borders of Seneca Lake some miles from its head are Glen Ora and Hector Falls. Numerous glens with falls enter upon Cayuga Lake, as Eagle Cliff Falls by the campus of Cornell University, and Taghannock, the highest waterfall in New York, a few miles to the north of Ithaca. Largely post-glacial also are the cliffs of rock seen so extensively on the lake shores, and forming, especially on the east shore of Cayuga Lake, one of the finest natural geological sections in the world.

The remaining changes may be placed under the head of lake filling. No perceptible change has been made in the area of the lakes by cutting down of outlets, for, as has been seen, such cutting has not yet reached up to the lakes themselves. In this they agree with a recent statement regarding the lakes of the

Adirondack wilderness.* The Finger Lakes, however, do not agree with the Adirondack lakes in rapid development into vlies or natural meadows. The only approach to an exception is at the head of several lakes, as the level tract on which Ithaca and Watkins are built. These areas must be due to filling, and doubtless result from the silting up of the always shallow southern ends, by materials brought not only from the hills directly above them, but also by debris contributed from all the side ravines as far south as the divide, these materials being brought down by the inlets and building the land area farther and farther to the north.

Along the margin of the lakes are many points, in area from a fraction of an acre up to several acres. They are, of course, delta deposits made by lateral streams, in some cases assuming the form of true alluvial cones. They are utilized as steamboat landings and sites for villas, and add to the beauty of the lakes, but are not as great in extent as one would expect. Why there should be less filling than in the Adirondacks it is hard to see, especially as the soil is largely bare of forests and exposed by agriculture. The cones do not appear to affect the soundings to any distance, which is doubtless due to the fact that the transporting streams are torrents which discharge little solid matter except in the spring, and then of such large fragments that they come to repose near the shore.

The bottom filling I regard as small in amount. The soundings fairly show that there is little or no morainic accumulation at the bottom, and we probably have a

* See an interesting account of "Lake Filling in the Adirondack Region," by Prof. C. H. Smyth, Jr., American Geologist, February, 1893.

moderate depth of fine silt mantling the rock contours of the several depressions. At a distance of 500 feet from the foot of Skaneateles Lake, the Syracuse water engineers have found 6 to 8 feet of fine, smooth lacustrine clay. As they progress with dredging toward shore they will pass into the underlying rock or till, and the depth of lacustrine filling at that point will become evident.

Still, on the whole, the amount of filling in the Finger Lake region cannot be considered unimportant or the rate a slow one, for the geologist is, of right, lavish of time. In his mode of reckoning, therefore, lakes are evanescent products of world-making energies. They were born yesterday and will perish to-morrow, but not without filling their place in the economy of nature and adding, in varied ways, their contribution to the resources of man.

HONDURAS.

BY

E. W. PERRY.

As far from New York as Denver is lies a country which has of late been often mentioned in the news columns of American papers. It is said to be passing through one of those spasms which were, a few generations ago, so common in Latin America as to give the rest of the world a belief that there was scarcely time to recover from one before another began.

The Republic of Honduras extends some 400 miles from east to west, its northern coast line following closely the sixteenth degree of north latitude, midway between New Orleans and the equator. It is one of the few regions of earth which have a truly temperate climate. Tempered by the northeast trade winds from the Atlantic, which sweep across the country every day, from the Caribbean Sea to the Pacific Ocean, 200 miles away, the mean temperature for many years in succession has been 75° F., the range being from 60° to 96°.

As a whole, the country is mountainous, open and sunny. The hills are covered by a growth of long-leafed pines, beneath which are grasses that afford pasturage for some half a million cattle. On the high mesas grow rice of superior quality, barley and coffee. Among the irregular mountain ranges are large and fertile valleys that yield two or more crops each year,

and might be easily made, by irrigation, to give a constant succession of fruits and grains.

On the Atlantic slope large plains rise gently from the sea to the base of the mountains. In the extreme northeastern corner of the Republic the plains are from 60 to 80 miles in width. Across these plains flow a number of rivers of goodly size, some of them navigable by steamboats for many miles. Chief among them is the Patuca, fitly called the Mississippi of Honduras. From the Caribbean to the Portal del Infierno, or Entry of Hell, it bears the name of Patuca. From that narrow and deep cañon to its source in the far interior of Olancho the river is known as the Guayape. Near the city of Jutigalpa, capital of Olancho, the Guayape is joined by the Lepiguare and by the Jalan, both bringing from the quartz hills gold which has for many a generation given employment and spending money to the natives, and has of recent years tempted thousands of good pounds sterling from the purses of Englishmen.

The Jalan rises in the edge of the Department of Tegucigalpa, and winds through large valleys in which are several towns of considerable size. Chief among these, perhaps, is Talanga, some 36 miles from Tegucigalpa, the national capital.

Twelve miles below Jutigalpa the Rio Telica enters the Guayape from the west, draining the valleys of Manto, rich in coffee, hides and sugar, and having great wealth of copper, silver and gold locked in her hills; of Jano and of Guata, both smaller than the valley of Manto, but rich in like natural stores. Below the junction of the Telica and the Guayape the Gual-

lambre adds its flood to the larger stream, which, a few miles farther down, breaks its way through a high dam of lava and other volcanic rock, and, with a grand rush, becomes the Patuca. Below the Portal are the Raudales Caoba, or Mahogany Rapids, which are the most difficult obstacle between the Portal and the sea. The Guampu, the Cuyumel, so called because it is a favorite resort for a fish of that name; the Amacwas, or river of honey-bees; the Waspresini, or swift water; the Guineo, or river of bananas; and the Malawas, or river of the breasts, are the other tributaries of this noble river, which can be easily navigated by steamboats as far as the Waspresini, at least 125 miles.

The Roman, or Aguan, rises in the mountains that are the boundary between the Departments of Yoro and Olancho. For many miles it is broad and deep, and drains a wide and exceedingly fertile valley where millions of bunches of bananas might be easily grown every year. The forests along its banks have given to commerce many thousand tons of mahogany, and doubtless contain more than have been taken from them. The Aguan enters the Caribbean at a point 25 miles east of the spot where Columbus first put foot on the American continent. He soon afterward landed at the mouth of Black River, 70 miles farther east, after beating against the trades with his ramshackle old tubs until patience was exhausted and courage almost gone. The Black is navigable for several miles. English colonies were established two or three times at the Black River, and a fort was built there by the British Government. A number of plantations of sugar, coffee, cacao and cocoanut palms were estab-

lished near, and the Province of Victoria bid fair to become prosperous and happy. But that and other encroachments by the English on Central American territory led to the friendly and rather significant intervention of the United States when Marcy was Secretary of State. Fort Wellington was abandoned, the colonists were removed, and the region settled again into a savage state.

Twelve miles east from Black River is the Rio Platano or Plantain River. It is unknown to the geographer, but has some features of interest. An exploration and map have recently been made by Harry W. Perry, who tells of the discovery of a number of granite rocks standing in the stream, and bearing on their surfaces deep carvings of strange figures. One of these works of the art of a people long buried in the oblivion of ages is a beautifully cut scroll of curious and intricate design. Another is a human face showing plainly the peculiarities of Chinese physiognomy. Far up this river lie the ruins of a city, and not far from it is a cave wherein lie the stone hammers, the bowls and the metates of granite, on which was ground the corn for the tortillas that were the food of mankind from California to Patagonia, long ages before white cutthroats brought civilization and drunkenness, Christianity and rapine to that fair land.

Each of the rivers named flows through forests in which mahogany, Spanish cedar, rosewood, lignumvitæ, ebony and other precious woods abound, and India rubber, Brazil wood, logwood and other dyestuffs are found. It was from the regions whence they come that the best sarsaparilla and cacao or cocoa known to com-

merce have been brought. The valleys they drain can be easily irrigated by their waters, and thus be made to support thousands of people where now one gets a sometimes scanty subsistence; for those sunny, elevated and deliciously cool vales do sometimes suffer from lack of rain enough to carry the crops of maize, upon which the masses depend for bread, to maturity.

Among the ranges of mountains that separate Honduras and Guatemala rises the Chimilicon River. Flowing eastward it runs parallel with the north coast of Honduras, until it reaches the great valley of Sula and turns to the north. Before it reaches the valley it receives the waters of the Santa Barbara, a river which has, if the statements of the natives be true, an unusual course. They say that the stream has its origin in the south end of Lake Yojoa, from which it flows to the southward a short distance and disappears beneath a mountain, to burst forth again not far from the village of Taulebé and make a grand sweep around to the westward, then north to join the Chimilicon. I give credit to the story because I know that the Agua Azul, the Blue Water, gushes out, a small river with a strong current, from the hills on the east side of the lake and soon tumbles into that remarkable body of water.

Yojoa is a curious lake. It lies some 2200 feet above the level of the sea, between a gentle slope on the eastern side and abrupt mountains on the west. Like most mountain lakes, it is often swept by a sudden squall that makes sailing a risky pastime. The lake swarms with fish, and game abounds in all the woods and on the plains about. Its waters are shallow, particularly at the southern end, where are large reedy

marshes. From those marshes flows the stream mentioned, that is lost beneath a hill, and from the northern end flows another river that runs along about a mile as a well behaved river should, and then it too plunges under a range of mountains and is lost to human sight until it comes to light, miles away, a goodly river, the Rio Blanco, and glides gently down to join the Humuya, which drains the great valley of Comayagua, and the Sulaco, which comes from near the head waters of the Jalan. The Sulaco, the Humuya and the Blanco form the Ulua, which runs parallel and very near to the Chimilicon until lost in the Caribbean Sea.

As a whole, Honduras is an open, sunny, well grassed and well watered land, swept every day by cool breezes. Her mountain tops grow good rice, maize is produced in every corner of the land and is the staple breadstuff; from fields planted years and even generations ago, and never since replanted, cane exceeding in richness of its yield of sugar the best grown in the Southern States, has been harvested continuously. Cotton of a staple said to be equal to Sea Island is gathered, year after year, from plants that have grown into stout trees 20 feet or more in height. Coffee is grown in quantities great enough to supply the home demand, and to leave considerable for export. She has a long list of indigenous edible fruits unknown to millions of people of northern climes, and to these she adds bananas, cocoanuts, pineapples, oranges, lemons, limes and others commonly seen in American markets. Her few peaches and apples are wretched seedlings, and are seldom if ever allowed to ripen on the tree, but are eaten green and are even more abominable to palate than they

would be if ripened. But the blackberries which grow wild on the mountains are of great size and most delicious in flavor to one from the fields of the North.

The banana is the most important of all agricultural productions of Honduras. Although only a few patches of bananas are to be found on the coast, one and a quarter million bunches, or fully $870,000 worth, are exported per annum. If all the land suitable for banana growing within ten miles of that coast were planted with this fruit. the crops would yield an average net profit, at present prices, of more than $100,000,000 per year.

Mineral deposits of great richness have been found in nearly every part of Honduras. Silver mines have given millions of dollars' worth of that metal to the crown of Spain in payment of the "king's fifth," and the mines are still worked. Gold is found in the quartz veins and in the placers of the Atlantic slope, large deposits of copper and iron exist, and considerable beds of coal have been discovered near the north coast. Phosphate beds also exist close to that coast.

Scarcely a square league of the Atlantic slope of the country, covering about four-fifths of the whole republic, is without streams which afford unlimited water power. The configuration of Honduras, its situation between two great oceans, the open, dry character of the land whence these streams flow, and the relation the whole bears to the moisture-bearing trade winds, warrant the belief that the rainfall must continue practically unchanged even though all the forests should be in time cleared away.

The climatology of Honduras is peculiarly favorable

and pleasant. The days are of nearly equal length throughout the year and the nights are fully ten hours long. There are what are popularly termed the dry seasons and the rainy seasons, but the latter term conveys to the average mind an erroneous impression. A more correct idea would be given by saying that the rainy season is one in which rains fall, and the dry season is one in which few showers, or none, are seen. Labor in the open fields is seldom stopped by rains, as these usually come in the late afternoon and night, and the mornings are sunny and comparatively cool. The trade winds sweep over the land every day, and the temperature is always delightfully refreshing in the shade, the range being from 60° F. during the northers, to 97° F. in exceptionally hot hours on the lowlands or in sheltered valleys. But such breathless hours are rarely known.

As would be expected of a country so entirely free as Honduras is from swamps, and swept every day by pure winds from over the ocean, there are few severe diseases and fevers are usually light and easily managed. Pneumonia and other inflammation of the lungs, diphtheria and scarlet fever and similar ailments are unknown, and ague, typhoid and kindred disorders are rare and yield easily and quickly to remedies commonly used in the United States for the cure of such maladies. Still such ailments are sometimes seen, particularly during the rainy seasons, among people who live in exposed places. In a broad sense it may be said that no attention is paid to sanitation, and there is cause for wonder that the people are so free as they are from deadly diseases.

Honduras has a population of 263,073 males and 168,844 females, or 5.17 males and 4 females per square mile of her territory. The census shows an increase of 24,628 in population since the year 1881. Of the people, 69,871 are aboriginals and 362,046 are of mixed Spanish and Indian blood or of foreign birth. In speech, manner and dress the people are quiet. They are frugal, industrious, and hospitable to the limit of their powers. The honesty of the masses wins praise from all decent Americans and Europeans who know them. The speculative spirit has little hold on them, and bankruptcy, embezzlements and robbery are practically unknown among them. Credits are long and payments slow, as in all countries where transportation is difficult, and merchants know personally and perhaps intimately the character and standing of most of their customers.

Honduranians are remarkably peaceful and law abiding. Murder by Honduranians is almost unknown. Freedom of speech and worship are guaranteed by the constitution and insured by public sentiment, as are the right of suffrage, of liberty and of property. For many years members of congress and the presidents have been elected lawfully and peacefully, under the provisions of a constitution which resembles that of the United States. The legitimate government has proved itself strong enough to promptly quell all attempts at unlawful disturbance. Pauperism is almost unknown. In some of the larger cities people are permitted to beg on Saturday, but few take advantage of that permission.

Progress in Honduras has been much retarded by

the enormous bonded debt, incurred for the purpose of constructing a railway that was to extend from the Atlantic to the Pacific, across the Republic. This debt, including interest to January 1, 1892, is:

Issued.	Amount of Issue.	Rate of Interest.	Amount, Jan. 1, 1892.
1867.....	£78,800	5 per cent.	£ 282,871
1867.....	900,700	10 per cent.	10,990,579
1869.....	2,176,570	6 2-3 per cent.	10,288,309
1870.....	2,242,590	10 per cent.	19,182,231
Totals.....	£5,398,660		£40,743,991

Honduras has recently granted to enterprising parties several concessions for building railroads within her borders, but all have been abandoned, probably because the projectors learned that the bonds above mentioned are a first mortgage on the domains and forests of the Republic, on the general revenues of the State, and especially on the custom-house duties of Amapala, on the Pacific. There is in the original contract a clause by which the government agreed that it would not grant the right to any to build another road from ocean to ocean. It is difficult to induce capitalists to invest in such enterprises. Before they will do so it will probably be necessary to secure the liquidation of the bonded debt of $198,015,797.50 now hanging over the country, a debt that may well be called hopeless, since the entire revenue of the Republic does not much exceed $8,400,000 per annum, while its necessary expenses are $8,385,000. The indebtedness is equal to $458.45 for every man, woman and child in the land, while the total average exports from the country average only $6.21 per capita. If the entire amount of the exports could be devoted to paying off

the debt, and if interest thereon should cease now, 74 years would be required to accomplish the task. Stated in another way: this debt is equal to $4,205.50 per acre for every acre of land, public or private, in the entire country. The marvel is not that Honduras has not progressed more rapidly, but that she has managed to keep so creditable a place as she maintains among the Central American republics. This position is shown by the subjoined table:

Countries.	Population per square mile.	Exports per capita.	Imports per capita.	Total Foreign Trade per cap.
Costa Rica.....	8.94	$20.80	$18.96	$39.79
Guatemala.....	34.11	3.80	2.87	6.67
Honduras.. ...	9.17	6 21	5.79	12.00
Nicaragua.....	7.56	3.25	4.58	7.83
Salvador.....	91.97	7.57	4.59	12.17

A significant fact is that all the Central American republics are importing less than they export. Another fact is that in average population per square mile and in average of exports and imports per capita these five countries stand ahead of Mexico.

One serious obstacle to progress in Honduras has been an almost entire lack of means for easy and rapid transportation. Even the mails are carried on the shoulders of men, and all freight is carried on the backs of mules. To remedy this the government has recently made contract for the construction of 200 miles of wagon road to connect the national capital with the head of steamship navigation of the Rio Patuca, and by that stream with the Caribbean Sea. It is expected that these roads will lead to the early development of old and new mines by making it possible to take to them heavy machinery and by transporting from them

ores and concentrates without the enormous expense now necessary in doing that work. Agriculture will be promoted, large areas of fertile land will be brought into market, and great tracts of forest now practically inaccessible will be penetrated, thus making available the wealth of high-priced woods with which they abound. This will increase the purchasing power of the people and thus swell the revenues of the government.

NICARAGUA:

STUDIES ON THE MOSQUITO SHORE

IN 1892.

BY

COURTENAY DE KALB.

I.—Historical Sketch.

Low-couched along the Caribbean Sea, with the Nicaraguan Andes rearing their forest-covered walls behind, reposes a narrow strip of sand and jungle which has borne the brunt of centuries of diplomatic juggling. Serving as the cat's-paw for Great Britain in her earlier schemes to menace Spain, and in her later efforts to capture the only possible Atlantic terminus of a trans-Nicaraguan ship-canal, Mosquitia was finally abandoned to the misery of an abnormal political status, involving independence without power and dependence without succor, when the risk of war with the United States rendered her more a source of danger than of profit to her former British "ally." Pampered and petted for generations, encouraged and aided by the English in depredations upon her Spanish neighbors, she now finds herself hampered by those she formerly despised, and whom she now hates bitterly. Discontent, vexation, enmity, are working as a ferment in the people of Mosquitia. It may come to nothing, and it may produce a state of things in which her sovereign, Nicaragua,

JAMES CUTHBERT, *Sec'y.*
CHAS. PATTERSON, *Pres't.*

GEO. HAYMAN, *Head-Man.*
ROBERT HENRY CLARENCE,
Chief of Mosquitia.

EDWARD MCCRAL, *Head-Man.*
J. W. CUTHBERT, *Att'y-Gen.*

would be bound to preserve the integrity of her domain, —by military repression if need be. None could blame her, and yet the plain necessities of the case would impel an infraction of that cunning piece of British diplomacy, the Treaty of Managua. The infraction would be equivalent to annulment, and that would revive all anterior claims, which means that a British protectorate over Greytown and its vicinity could be re-established in the name of the Mosquito Coast. Neither the Clayton-Bulwer Treaty, nor any other, has aught to do with this aspect of the matter, as the history of Mosquitia and its entanglements will disclose.

By right of discovery the Mosquito Coast belonged to Spain, Columbus having formally taken possession, planting the standard of his Castilian sovereigns at the mouth of the Rio Tinto on August 17, 1502. He then rounded Cape Gracias á Dios, and made two landings, one at the Rio Grande, and the other in the neighborhood of Monkey Point, where he obtained the name of Cariari from the natives, which he gave to the entire region. He made no careful explorations. The low-lying land, singularly destitute of prominent landmarks, skirted by dangerous coral reefs and coral islands, offered few attractions to seekers of golden empires. The claim founded upon discovery was recognized, however, by a papal bull, based upon which a concession was granted to Diego de Nicuessa, whose expedition was wrecked at the mouth of the Wanks or Segovia river, just under the lee of Cape Gracias á Dios. From this period the coast attracted no attention until the rise of the buccaneers in the seventeenth century. Its numerous harbors, and wide lagoons, and the intri-

cate channels through its fringe of coral reefs, gave it fresh importance as a place of refuge, and as a convenient point from which to descend upon the Spanish Main, or to surprise the treasure ships from Cartagena. Cape Gracias, or more properly, the harbor at the mouth of the Wanks river, was the principal rendezvous of the buccaneers, and here also was the principal settlement and the home of the chieftain of the Mosquito Indians. From this piratical occupancy were derived the claims which England subsequently made to a protectorate over the coast. These claims, however, were the result of a gradual growth of English influence and of actual occupancy later on, so that in time her rights rested upon something better than flimsy pretence.

The buccaneers, perceiving the need of a resort where they would be welcome rather than tolerated from fear, used whatever urbanity and kindness of nature they possessed to render themselves beloved of the Indians. Trinkets, clothing, rum, and food were freely bestowed. They were taught the use of fire-arms, and assisted in their incursions upon the Spanish settlements north and south of them. Many of the pirates being Englishmen, the natives were early instructed to reverence the name and power of England, and the English language became familiar to them. When finally in 1655, Jamaica was seized for England under Admiral Blake with the co-operation of the buccaneers, the Mosquito fruit was ripe to fall into the English basket. Control was maintained through this piratical brotherhood until its final dissolution in 1688. The last contact of the Mosquito Indians with their freebooting friends was when they made their famous re-

treat from the Pacific Ocean, and descended the river Wanks, worn and wasted, seeking aid and protection from the very savages whom they had feasted and corrupted in the days of their strength and pride. Fearing to lose the advantage gained in Mosquitia, the chieftain of the tribe, who bore the name of Old Man, was taken to Jamaica in that year, and after affording infinite amusement to the profligate Duke of Albemarle, then governor of the island, was given what purported to be a commission as King of the Mosquitos, and a gold-laced cap, which he was told was his crown and emblem of authority. The document, which was long preserved among the Mosquitos, actually made the "King" a Governor General under England, and warned him to aid and succor all Englishmen visiting the coast. Subsequent visits were made by Mosquito chiefs to Jamaica, whence they returned with gifts and an ever-increasing notion of their own importance, which is probably the foundation of the legend current to-day among the Mosquito men, that they once held Jamaica in subjection and sent annually to levy tribute from the people of that island. Certain it is that a common Mosquito designation of Jamaicans is, "My Grandfather's Children," an appellation which is frequently thrown in the faces of the Jamaicans who now hold the reins of Mosquito government. This loose connection with England sufficed for all practical purposes until the tension between Great Britain and Spain in the early part of the eighteenth century prompted more definite relations. Vice Admiral Vernon wrote in 1740, "Great advantage might be made of the friendly disposition of this people (the Mos-

quitos) in case of war with Spain; and it is not to be doubted but in case of a rupture the government will improve so fair an opportunity of advancing the interests of the British Nation and its colonies." In the same year Gov. Trelawney of Jamaica urged upon the Duke of Newcastle the advantages that might be gained from inciting the Mosquito Indians to undertake extensive depredations upon the Spanish settlements. Efforts were also made to secure the formal cession of the coast to England by the Mosquito "King," a business negotiated by Robert Hodgson, who acquired the title of superintendent. British settlements were made, and British authority was maintained by troops sent from Jamaica in 1744. Spain made a protest against this invasion in 1750, and Hodgson, acting under instructions from Trelawney, represented that as England held considerable commerce with the coast, she was merely keeping a force on hand to repress Indian hostilities against the Spaniards, which would interfere with the even course of trade. This clever artifice deceived for a time, but when the trick became apparent, and British oppression provoked an insurrection of the Indians, Gov. Knowles of Jamaica made a plain statement of the case to the government, and advised a relinquishment of all claims to the Mosquito Shore. Accordingly England agreed, among other things, in the Treaty of Paris in 1763, to demolish all fortifications on the Mosquito Shore and other parts of Spanish territory, recognizing as valid the Spanish claim founded upon the papal bull. Fresh incursions followed in spite of the Treaty of Paris, which led to the treaty of 1783, by which England agreed to abandon the Spanish Conti-

nent. England persisted in holding Mosquitia even after this, claiming that it was not part of the "Spanish Continent," but belonged in the "American Continent," a subtlety extinguished in the supplementary treaty she found it expedient to ratify in 1786, whereby she explicitly renounced all claims to dominion or control over the Mosquito Shore. The Indians continued under the nominal rule of native "Kings," acting in accordance with the advice of British traders who frequented the coast, until the uprising of the Spanish colonies in 1821, upon which England at once re-entered Mosquitia, taking a native chief to Belize and crowning him as "King" under the formal protection of Great Britain. The first "King" was soon killed in a drunken brawl, and within the two succeeding years two poor wretches were crowned and dethroned by the English, and a third, Robert Charles Frederick, was, on April 23, 1825, erected to carry out the will of England more perfectly. Failing to fulfil satisfactorily the office of puppet, he was carried off in a British war-ship to Belize, where he died. His son succeeded, obeyed his English masters, and thus a line of hereditary chiefs was established which continues in authority to the present day. From one of the deposed "Kings," George Frederick by name, Sir Gregor Macgregor, after his flight from Cartagena, obtained a worthless grant of land which he sold to English merchants for £16,000 in good sterling coin. The result was an attempt at colonization which met with disastrous failure and a wicked sacrifice of the lives of hundreds of simple colonists. Sir Gregor, undismayed, once more endeavored to evolve something out of Mosquitia in the form of an ideal republic to be

known as Indialand, an asylum for men of all races, and of all creeds, which should be a sort of paradise in the centre of the New World. Conventions were held, and an elaborate constitution and code of laws drawn up, which were unquestionably the best ever yet offered to this unfortunate country. While the dream of an ideal Indialand was fading from the minds of its visionary advocates, England was slowly tightening her grasp upon the coast. The star of annexation had once more risen and fixed the attention of British statesmen. Preparatory to such a move the question of territorial limits was pressed toward a settlement. In the vague uncertainties of the past no effort to define them had even been attempted. The first authentic statement of the territorial claims of the Mosquito Indians is found in a work entitled "The Mosquito Indian and his Golden River," written by one "M. W." in 1699, eleven years after the end of piratical control, and printed in 1746 "for Henry Lintot and John Osborn, at the Golden Ball in Paternoster Row." According to this traveller, who was an Englishman, the Mosquito territory began at Cape Cameron on the coast of what is now Honduras, and extended as far as 165 leagues south from Cape Gracias á Dios. This would end at Pearl Lagoon, thirty miles north of Bluefields, and 100 miles north of Greytown. The western limit was less closely marked, being a shifting skirmish line between the Mosquitos and the Alboawinneys, probably the tribe now known as Soomoos. Later the English laid claim to Bluefields, but it appears to have been an invasion by the British and their Mosquito "allies" of the territory formerly held by the Cookra Indians. From

1836, however, the limits were rapidly extended westward and southward until at length the entire coast was claimed as far south as the Rio San Juan del Norte, including that river as far west as the Machuca Rapids, and its port of Greytown, then known as San Juan de Nicaragua. Thos. Strangeways, K.G.C., had unofficially claimed the coast for Mosquitia from Cape Honduras to the Rio San Juan, as early as 1822. The growth of trade with the west coast of North and South America, and the westward march of empire in the United States, made the importance of Greytown manifest to British statesmen. Actual occupancy of this new territory was not made, however, until 1848. The inevitableness of the acquisition of California by the United States showed to Lord Palmerston that the time had come to seize the natural gateway to our western possessions. The move was accordingly made, in the name of the Mosquito "King," two English war vessels entering Greytown harbor in the month of January, 1848, tearing down the Nicaraguan flag, hoisting that of Mosquitia in its place, and assuming the reins of government. The Nicaraguans succeeded in expelling the intruders, but the English returned with reinforcements and overpowered the Nicaraguans, whereupon all offices were filled with Englishmen, and a Jamaican police force patrolled the town. At the same time the British attempted the seizure of the Island of Tigre, in the Gulf of Fonseca, the supposed western terminus of a Nicaraguan ship-canal, rendering their motives in their Mosquitian usurpations no longer able to be concealed.

The outcome of these performances was the negotiation of the famous Clayton-Bulwer Treaty, signed on

April 19, 1850, whereby the United States and Great Britain mutually agree that neither "will ever obtain or maintain for itself any exclusive control over the said ship-canal," nor occupy, fortify, or colonize, or assume or exercise any dominion over Nicaragua, Costa Rica, the Mosquito Coast, nor any part of Central America, nor to make use of any protection afforded by either of the contracting parties to any Central American state to acquire such powers or privileges. There was nothing in the treaty relative to the Mosquitian invasion, and it in no wise terminated British control in the name of Mosquitia over the region adjacent to the Rio San Juan, although it was held to do so by our Department of State. The acts of this Anglo-Mosquitian government became so perversive of justice and order, more particularly in its infringement of the rights of American citizens, and in its interference with the Atlantic-Pacific Ship-Canal Company, an American organization, as to lead to Capt. Geo. A. Hollins, U. S. N., bombarding the town and driving out the English, on July 13, 1854, after failing to secure the protection of American property by the local authorities. The remaining population organized a government under a provisional constitution, which, under the terms of an armistice between Mosquitia and Nicaragua, held control of the port until the questions in dispute were finally settled by the Treaty of Managua in 1860.

It had been the general impression that the Clayton-Bulwer Treaty was to terminate English influence in the Mosquito Territory, which view was also held in Nicaragua. In answer to protests Sir H. Bulwer denied to Daniel Webster that the treaty was designed to

affect the position of Her Majesty on that coast, and the British minister to Central America, Frederick Chatfield, informed Nicaragua, on Aug. 16, 1850, that insistence upon her claims to the Mosquito shore "will not be much longer of any avail," that reliance upon "the protestations and assurances on the part of pretended friends" (viz.: Americans) is an incautious proceeding, and that "Nicaragua would do well to come to an understanding, without delay, with Great Britain, upon whose relations depend, not only the commerce and welfare of the state, but the probability of any positive measures being adopted for establishing an inter-oceanic communication across her territory, since London is the only place where sufficient capital and spirit of enterprise can be found for carrying out a project of such magnitude."

The same minister in December of the same year (1850) had "the honor to declare" to Nicaragua what were the boundaries of the Mosquito Coast, claiming the territory as far south as the Rio San Juan, and as far westward on that river as the Machuca Rapids. This series of complications coupled with British efforts to organize a government on the islands of Ruatan and Bonacca in the Bay of Honduras, led to a tedious diplomatic controversy, in the course of which Lord Clarendon justified British aggressions on the Mosquito Shore on the ground that the treaty of 1786 had been abrogated by the war between the contracting parties in 1789, regardless of the fact that in 1814 England had revived all treaties with Spain which had been operative prior to that war, and accused Mr. Buchanan furthermore of confounding the conditions of a sover-

eignty and a protectorate—the confusion very evidently arising from the difference between the American conception of a protectorate and the British practice under such conditions. Under pressure from the United States the Crampton-Webster Treaty was negotiated in 1852, wherein England tacitly renounced the contested protectorate, and surrendered to Nicaragua the Mosquito Coast, over which the Republic was to hold only a nominal sovereignty. The grounds of this treaty were not accepted by Nicaragua, so that in 1856 the Clarendon-Dallas Treaty was drawn up, containing provisions in many respects similar to those of the Treaty of Managua. This treaty, however, failed of ratification. Arbitration was then proposed, but rejected by the United States, which government finally discontinued such fruitless negotiations, threatening that the abrogation of the Clayton-Bulwer Treaty might be determined upon later. The risk of losing the signal advantages secured to her under that treaty, and the imminent danger of war with the United States, decided England on treating at once with Nicaragua and Honduras for the relinquishment of the Mosquito Coast, whereby, at the same time, she would appear to be doing an act of simple magnanimity. The Treaty of Managua and the Treaty of Comayagua were the results, which were accepted by the United States as a satisfactory solution of the pending disagreements. The difference between the two treaties is not a little remarkable. The Honduranian portion of the Mosquito Coast was ceded absolutely and unequivocally to Honduras. The Nicaraguan portion was ceded to Nicaragua under terms whereby to this day England

may, upon some seeming, trivial infraction, re-assume the rôle of protector over the Coast. The conditions of the treaty are substantially these: Great Britain recognizes the sovereignty of Nicaragua over "the country hitherto occupied or claimed by the Mosquito Indians within the frontier of that Republic"; a district within the territory of the Republic is to be assigned to the Mosquito Indians, under the sovereignty of the Republic; the Mosquito Indians are to enjoy the right of self-government according to their own customs and laws, so far as these are not inconsistent with Nicaraguan sovereignty; the Republic is not to interfere in any matters of government in Mosquitia; the limits of the assigned district are to be, on the south the Rio Rama, on the west longitude 84° 15′ W. from Greenwich, on the north the Rio Hueso, on the east the shore line of the Caribbean Sea (*vide* Stieler's Atlas); the Mosquito Indians are to have the power by their own vote of annexation to Nicaragua, and of thereby becoming citizens of that Republic; Nicaragua is to pay a subvention of $5,000 annually for ten years to Mosquitia for "the social improvement of the Mosquito Indians, and of providing for the maintenance of the authorities to be constituted" in accordance with the treaty; Greytown is to be constituted a free port, with certain privileges of local self-government. Certain duties were to be levied on goods entering at Greytown but destined for consumption within the Republic, such duties to be applied to the payment of the subvention to Mosquitia.

Difficulties under this treaty almost immediately arose. The subvention was paid promptly at first, and then withheld on the plea of illegal status of the new

chief, and of the government of Mosquitia being actually in the hands of foreigners, the latter objection being undoubtedly well founded. The true object of Nicaragua was, however, to force Mosquitia into annexation. Mosquitia was furthermore compelled to import all goods through the port of Greytown, upon which 10 per cent. duty was levied on the ground that the goods were intended for consumption "within the territory of the Republic." Nicaragua also undertook to grant privileges for exploiting the natural products of Mosquitia, and to require registration and license of German colonists desiring to settle on Great River in the assigned district. After a long controversy with England, it was agreed to submit the points in dispute to the arbitration of the Emperor of Austria, whose award was made in July, 1881. It is a document of the highest interest, of which only a brief résumé may be attempted. The sovereignty of Nicaragua was declared a limited one, Mosquitia being merely an inseparable, "political appurtenance of the main country." Nicaragua might not regulate the trade of the Mosquito Indians, nor levy import or export duties within the assigned district, which right belonged to the Mosquito government. Neither might Nicaragua grant concessions within the district. The collection of import or export duties at Greytown was forbidden. Mosquitia was allowed its own flag, with some emblem of Nicaraguan sovereignty attached. The subvention was to be paid in full, which was done at once.

The actual intention of Nicaragua in agreeing to pay this sum was to remunerate Mosquitia for the absolute sovereignty supposed to be acquired over the territory

adjacent to the Rio San Juan on the south and to the Rio Wanks on the north. She chose instead the pretence of magnanimity, attaching no conditions to her obligation to pay, so that she now holds this territory only through the faithful observance of all and every clause in the Treaty of Managua, any rupture of which might revive Mosquitia's former claims. England's right to interfere in behalf of the Mosquito Coast for the fulfilment of the treaty was expressly recognized by the Emperor of Austria, in these words: "England has an interest of its own in the fulfilment of these conditions stipulated in favor of those who were formerly under its protection, and therefore also a right of its own to insist upon the fulfilment of those promises as well as of all other clauses of the treaty."

The prospects for fresh interventions by Great Britain, and the outlook for future stability of government in Mosquitia, will best appear from a critical study of the country, its people, laws, and present relations with its nominal sovereign.

II.—Description of the Country.

In the very title of the Mosquito shore, devoid of meaning though it be, lurks a suggestion of flat and miasmatic wastes which personal inspection speedily confirms. Save for Bragman's Bluff, whose whitish cliffs mark the limit of an eastward off-shoot of the Andean upheaval, and for Bluefields Bluff away to the south, which guards the entrance to one of the loveliest bays in Central America, the coast for leagues and leagues presents the same uninterrupted line of level verdure, like a low horizon cloud, as viewed from the sea,

ashen gray in color, here and there empurpled from the blending in the atmospheric blue of forest tints of red and brown. At intervals a little dip in this level line, scarcely discernible to the unpractised eye, shows where a river breaks through to the sea. Parallel with the shore, at distances varying from three to six miles and more, extends a chain of coral reefs and islands, dividing the beryl-tinted shallow waters of the coast from that wondrous blue of the open Caribbean. The reefs often reveal themselves by foaming snow-white breakers. The islands, seldom more than a few hundred feet in length, are covered to the water's edge with groves of cocoanut palms, forming pictures ideally tropical, ideally beautiful. The reefs are not continuous, but are gradually becoming so, and new islands are forming by accumulations of detritus upon the submerged ledges, so that in time a new coast line will result, enclosing lagoons between it and the present shore. In this manner the existing coast line was developed, behind which lies a series of wide lagoons, having a still more ancient coast line for their western limit, beyond which again are found other lagoons and marshes that were once the open sea. The Mosquito shore is thus seen to owe its existence to a series of seaward growths, the outcome of a gradual continental uprising, assisted by the secretions of the coral insect. Close by the ocean there is little land available for industrial uses. Excepting occasional slightly elevated sandy beaches, suitable for cocoanut plantations, the whole coast is fronted by impenetrable mangrove swamps, a jungle of fantastic gnarled and twisted roots and branches, so serpent-like in form as to inspire involuntary shudders. Further

inland ancient marshes have become converted into wide savannas, affording pasturage for cattle, and these in turn give way to extensive forests of pitch pine, which are succeeded by the typical forests of the tropics which envelop the country westward to the mountains, sweeping up and beyond their summits into the central regions of Nicaragua.

In spite of such extensive areas of swamp and marsh, the climate has been proved by experience to be free from that deadly character, which is the bane of so large a part of the American Isthmus. All the conditions productive of malaria are present, but the ceaseless trade winds from the Atlantic and the Caribbean sweep away the miasmatic exhalations, and purify the air. It is a land blessed with abundant sunshine, but while overhead the sky is clear and blue, the vapors borne westward by the winds condense upon the mountains in towers of cloud which seem to topple over as night draws on, and roll back upon the coast in furious showers. To whatever cause it may be due, the Mosquito Shore is not unhealthy, and no authentic case of yellow fever has ever been reported throughout its length, an immunity due no doubt in part to the rigid quarantine regulations which have been maintained for decades.

As might be expected from the character of the coast, it possesses many harbors, which will assume an increasing importance with the growth of commerce. Each of the five great rivers of Mosquitia either empties into a lagoon before reaching the ocean, or else has a lagoon connected with it by navigable channels. These lagoons form perfect landlocked harbors, but

unfortunately the entrance to each and all is obstructed by shallow sand bars. With the exception of the Bluefields bar, the depth of water does not in any case exceed seven feet at high tide. Fortunately, on the other hand, when trade shall warrant the expense, an ample depth of water can be secured over these bars by systems of jetties, in each instance not longer than from one and a half to two miles, having naturally constricted channels behind them pouring down their floods with a velocity of from three to four miles an hour. The mangrove thickets growing to the very ocean's edge would lend themselves better than willows to fixing the jetty embankments, and by encroaching ever more and more upon the rivers they serve now to confine them within such narrow limits as to keep channels scoured out to a great distance inland, of sufficient depth to float large ocean-going ships. Beyond all question the finest harbor in Mosquitia, if not the best on the whole eastern coast of Central America, is that of Bluefields. Here is a natural depth of water of 16 feet, easy to be increased by dredging, or more permanently by jetties, with an enormous sheltered lagoon, furnishing abundant anchorage ground, with an elevated point, or bluff, on its eastern side, with thirty feet of water close up to the shore, admirable for wharfage facilities. Bluefields Lagoon is more than fifteen miles in length, and seven miles in width, a veritable inland sea. Its shores are high and well-adapted to agricultural pursuits, particularly to the raising of bananas. The culture of this fruit has already assumed great importance here, the banks of the Bluefields or Escondido River being lined for over

sixty miles with extensive plantations. The Bluefields River, the most important in the Mosquito Reserve, is navigable for vessels of eighteen feet draught for sixty miles from its mouth, and is actually ascended to that distance to-day by ships of the Morgan Line and of the Bluefields Banana Company, plying between this point and various ports in the United States. Another advantage of the port of Bluefields is that the high land, beginning at the very edge of deep water, extends uninterrupted by swamps and marshes back to the mountains, through which is a pass leading into the central plateau at San Miguelito on Lake Nicaragua, constituting a feasible route for a railroad. An American company has already begun the building of such a road, which certainly has many promising features.

The city of Bluefields, capital of the Mosquito Coast, is situated upon rising ground on the western side of the lagoon, seven miles distant from the anchorage at "the Bluff." It can not be reached by vessels drawing more than four feet of water, owing to bars which have formed in front of it, which circumstance greatly retards its commercial development. Various inconclusive explanations are offered for this unwise location of the town, but luckily it boasts no architectural extravagances which will impede a change of site, and a movement has recently gone so far as the acquisition of land on "the Bluff," upon which is to be built a new city. Common sense stamps a mark of approval on the project, and the pockets of the merchants which will fatten by this removal, through the saving of all lighterage charges, will determine its execution. The new site has many advantages. The Bluff is a rounded hill,

lengthened toward the north, somewhat less than half a mile in width, and about a hundred feet in height. On one side is the ocean, on the other the picturesque lagoon, with its rim of hills, and far to the southward the blue mountains of the Cordillera de Yolaina; as charming and as healthful a position for a city as could well be found. From a distance Bluefields presents the picture of a white town, peeping from masses of verdure along the sides of a hill which rises like a little mountain behind it. A little steam launch, or a sail boat, conveys you from the ship, past palm-covered islands in the lagoon, toward the town whose picturesqueness changes upon approach to a very plain assemblage of wooden structures, most of which stand well up from the ground upon posts which serve in lieu of foundations. There is not the slightest suggestion of Spanish influence anywhere discernible. It looks decidedly American; not unlike a Western mining town in many of its aspects. It bears marks of rapid growth, a sort of hasty, inconsequential development, suited to present emergencies, until it shall have time to build more permanently. There is just one street, a long, winding, hilly, rugged roadway, over bare outcropping reddish rocks. Dwellings, stores, and occasional palm-thatched huts are promiscuously intermingled. Now and then are seen attempts at gardens, some of which are luxuriant and beautiful, the richly-foliaged bread-fruit tree being conspicuous at every turn. The mission chapel, a spacious wooden tabernacle of large seating capacity, stands, surrounded by cocoanut palms, in a prominent situation overlooking the lagoon. Below it in a hollow, built over the water,

is the public market, where turtle and beef, cassava and fruits, are dispensed over none too cleanly counters. Just beyond is the government building, unpretentious, wooden, with a sign of state in its flag-staff and its solid cement stoop—very like a little Western court house. A few little lanes, not worthy the name of streets, straggle off from the main, or King Street, into that region locally known as "out back," where the women wash clothes and spread them to dry on the grass beside Gunboat Creek, which insignificant streamlet loses its identity in the broad sheet of flood waters which sweeps down the hillside during the early morning showers. These uncontrollable floods are a sufficient vindication of the disuse of foundations in buildings here, but there seems to be no adequate explanation for the absence of those broad rambling piazzas, usually so common in southern countries, and which add such comfort to tropical existence. On the whole, however, in spite of much filth obnoxious to a Northerner, Bluefields may rightly claim to be one of the neatest, cleanest cities in tropical America, which compensates for a host of other deficiencies. Its population to-day numbers about 3500 souls, augmenting constantly, and destined to rapid increase upon the founding of the new city on "the Bluff." It may easily become a more favorite resort for tourists than any of the West India Islands, when some one knowing the needs of this class of people shall build a comfortable hotel on "the Bluff," and provide a wholesome cuisine. It is only five days steaming from New Orleans, the climate is propitious, and the scenery charming. In fact there is no business enterprise which would accom-

plish so much as this for the commercial advancement of the coast. Such an influx of well-to-do foreigners as would ensue might work advantages for the Mosquito Coast, similar to those which have resulted from a like cause in Florida.

About sixty miles up the Bluefields River is the little town of Rama, the centre of a large banana trade. The possession of this point is disputed by the Mosquito government and Nicaragua. The Nicaraguans now hold authority over it, and the question may involve a new arbitration if England responds to the protests of Mosquitia, although the matter depends in reality upon nothing more than the determination of a meridian. The exact demarcation of limits for the Mosquito Reservation will probably occasion numerous disputes. The adoption of *any* natural boundaries lying near those contemplated by the treaty, and proving upon investigation to be more convenient, was provided for in the Clarendon-Dallas convention, which failed of ratification. The Treaty of Managua allowed no such adjustment to geographical configuration of the territory, and there already seems to be grave doubt that the so-called rivers Rama and Hueso have any such definite character as will serve for the stipulated limits, in which case nothing short of a supplementary treaty will meet the exigency. The assumption of the Mosquito government to grant mining claims, at some distance in the interior towards the northern part of the Reserve, has recently filled the air with additional uncertainties, likely to lead to a critical tension.

North of Bluefields about thirty miles lies Pearl

Lagoon, receiving a large river of the same name. On the western shore of the lagoon is situated the pretty little town of Pearl City, almost as picturesque as its sister city on the south. Here is the home of royalty, the residence of the "King," or Chief, as the people are now more wisely calling him. The commercial importance of the place has decreased since the exhaustion of the mahogany forests on the river behind it. Another forty miles northward brings one to Rio Grande, where is situated a straggling town, consisting principally of palm-thatched huts, with a few frame residences and traders' shops. The mahogany cutting on the upper river brings no little business to the place, and rubber is still brought down in considerable quantities by the Indians. North of Rio Grande some twenty-five or thirty miles is Principulca, the most thriving of the small towns along the coast. Its aspect is not engaging, and it can never be made so. The ground is low, reclaimed from the mangrove swamps surrounding it. The Principulca River flows in front, the single irregular line of huts and flimsy frame structures following along the southern bank of the stream and curving around upon the beach which faces the Caribbean. Rubber has been its chief commercial dependence until recently, when discoveries of gold upon the head waters of the Principulca and its tributaries, have given such an impetus to trade that all the wholesale merchants of Bluefields are establishing branch houses here, and many new buildings are being erected. The actual centre of mining is at Cuicuina in Nicaraguan territory, but, as the only route of communication with the world is by way of the river to the

coast, Principulca becomes the centre of the mining excitement, and reaps the principal profits from it. From this point northwards are numerous little settlements, consisting chiefly of Indians and Sambos, of whom more anon. Two places among these deserve special mention. The first of these is the famous Schultz plantation, known as Wounta, which is an object lesson of value as showing what thrift and energy can accomplish, even on the Mosquito Shore. A grove of cocoanut palms four miles in length is something of itself to attract attention. A well-tended garden of many varieties of vegetables, flocks of fowls, pastures well-filled with cattle, bespeak provision for the natural wants of man, which commands a respect for the husbandman scarcely comprehensible outside of a country where people make shift to exist on turtles and plantains, and a few other ill-cooked substitutes for food, as is the case throughout nearly the whole of Mosquitia. The fact that Wounta Plantation boasts the finest house on the entire coast is likewise significant. The house, it is true, is the result of wealth, but the wealth, on the other hand, is the result of a thrifty utilization of the opportunities which are open to all. Whoever fares badly in such a virgin country as the Mosquito Shore has naught to blame but his own deliberate choice of ill instead of good. The second important place north of Principulca is that rather indefinite spot known as Wawa. At the mouth of the large river of this name is an unimportant settlement. On the shore of a beautiful lagoon a few miles farther back is the town of Caratá, the centre of some small rubber trade, and eighteen miles beyond this on the Wawa River is

"the saw-mill," the only saw-mill between Panamá and the city of Truxillo in Honduras. Americans have started the enterprise, and, if it signifies anything to be driven to its full capacity with orders piling up ahead, the mill must be a profitable enterprise. The lumber is obtained from the forests of pine, which extend for miles between the swampy river margin and the interior savannas. The logs brought to mill are very large, often four feet in diameter at the butt. The trees are tall and straight, with coarse bark like our yellow pine, the foliage being in clumps at the ends of the branches, with three leaves in a whorl. They are heavy with pitch, surpassing in this respect the average of our Georgia pines, which often makes sawing difficult. Reports of gold discoveries in the vicinity of Wawa have drawn thither a number of American prospectors, but nothing is definitely known as yet regarding the outlook for mines in this region. The saw-mill, however, is attracting a population which will doubtless increase, especially as the wide savannas, so accessible here to deep water, are encouraging a cattle raising industry, which may become important within the next few years.

The trade of the Mosquito Coast has been growing in spite of the practical exhaustion of its rubber reserves, a circumstance due to the corresponding growth of the banana industry, and to the discoveries of gold. The mining excitement will probably work much more immediate harm than benefit, by drawing off men and money from enterprises of certain profit to one which is essentially precarious and treacherous. The expansion of credits in consequence of the hopes entertained

of large returns from the miners, who obtain advances upon this basis from the merchants, will result in failures and a serious depression of trade, should there ensue a shrinkage instead of the anticipated increase in the production from the gold washings—a result not unlikely to happen. As yet no quartz mines have been opened up, excepting "La Constancia," which is worked in a small way by primitive methods, practically proving nothing. The "placer diggings" have in some instances yielded large quantities of gold, and about five hundred men are now engaged in working them. The output for 1891 was 5000 ounces of gold, running about 850 fine. Up to October, 1892, the amount exported within the year reached 8000 ounces. So far as definitely known these mines are all in Nicaraguan territory, ninety-five per cent. of the total product coming from the head waters of the Principulca River. Gold also comes from all of the other rivers, and the Bluefields River is said to have once produced considerable amounts. The banana industry up to the present time is confined to the Bluefields River, which exported in 1891 no less than 1,155,000 bunches, worth about $231,000. Large bunches containing eight "hands" bring twenty cents on the spot, and six to seven "hand" bunches bring about thirteen cents. The value of the gold exported in 1891 being about $85,000, it will be seen that bananas are more important to Mosquitia than the precious metals. Next in order of value to bananas is the rubber, of which 600,000 pounds were shipped in 1891, worth about $210,000, paying a duty of one-half cent a pound. This is quoted in the market as "Nicaragua scrap," and

"sheet." It is the product of the *Castilloa elastica*, a large, handsome tree belonging to the *Artocarpaceæ*, or bread-fruit family, entirely distinct from the euphorbiaceous seringas which furnish the rubber of the Amazon. The Castilloas grow in the highlands instead of the low marshy districts, so the rubber shipped from Mosquitia comes in fact largely from Nicaraguan territory. The Indians are the rubber gatherers, and in their endeavors to secure a large output they bleed the trees of sap too frequently, from which cause the rubber forests have been so far destroyed that it is only a question of a few years more when rubber exportations from this coast will cease. The governments of Nicaragua and Mosquitia could well afford to encourage the planting of rubber orchards to supplant the wild supply, by offering a bounty upon every pound produced in this way. The duties upon the increased importations of merchandise as a result of this increased exportation of rubber would more than reimburse the governments for this outlay. To be sure it takes ten years to mature a rubber tree, but—ten years roll quickly by, and the people have plenty of leisure.

Cocoanuts and hides form additional articles of export, and an American firm is fast exhausting the mahogany forests along the rivers of Mosquitia. The possible productions of the country would constitute a tedious catalogue. It possesses all the advantages of other well watered tropical countries, without the disadvantages of climate which so often interfere with their development, yet there are few regions which have been so neglected by modern enterprise as this. The reason for this is not occult, or hard to find. It

lies partly with the people who live here, and partly with their peculiar government, for which latter they are not to blame.

III.—THE PEOPLE.

The Mosquito race has become so confused through an intermixture of blood for centuries, that it has lost its distinctive features, and has no existence to-day save in name alone. Class distinctions have, however, arisen, based upon the assumption of racial difference, resulting in what might be termed a Mosquito clan, cherishing antipathies productive of social discord and political evil. The characteristics of the Indian are still clearly manifest in this clan, sometimes predominating, but usually strongly modified by Caucasian and African features. The African admixture produces a type known as Sambos, which had its origin about the year 1650, when a large body of Negroes, most probably from the Island of Samba at the mouth of the Cassini river in Senegambia, were cast away on the coast of what is now Costa Rica, by the wrecking of a Dutch slave ship. These Sambas wandered northward as far as Cape Gracias á Dios, and succeeded in obtaining an allotment of land near Sandy Bay from the Mosquito Indians, with whom they speedily merged, adopting their language and customs. Long before this period white blood had entered through contact with the buccaneers, and upon the dissolution of this floating "Republic of Freebooters" in 1688, no less than one hundred of these rather undesirable colonists settled among the Indians. Constant accessions of whites and negroes from Jamaica have continued ever since, confusing the

mixture more and more, and largely swelling the numbers of those whose trace of the African classes them as Sambos.

Early records of the Mosquito Indians describe them as short in stature, usually dark in color, with finely cut features, and small straight noses, but these facial characteristics have changed to a decidedly negroid type. Their reputation for intelligence seems not to have been exaggerated, although it must be borne in mind that this quality instead of being repressed by servitude was encouraged by the peculiar relations which subsisted between them and their English allies. The language of these people was first reduced to grammatical principles by Alexander Henderson of Belize, who published a treatise upon it in New York in 1846. More recently Lucien Adam has published in Paris an exhaustive analysis of the language. It is fairly complex in structure, has a rich vocabulary, and is notably free from harsh gutturals. It is so generally spoken to-day that the Rev. G. Sieborger has translated the four Gospels into this dialect, although there is scarcely a man, woman, or child in the whole Reserve who cannot use the English language to some extent. Likewise there are few people who cannot speak the Indian tongue.

The Mosquito nation in the olden time was supposed to number about 10,000 souls. The present population of the Mosquito Reserve, which does not include the Mosquito tribe in Honduras, is probably about 7500, of which number upwards of 4000 are embraced within the Mosquito clan. The remaining 3500 are negroes, —mostly Jamaicans,—and whites, who reside chiefly in

the larger towns. Regard for personal appearance is one of the predominant traits of all classes on the coast. The women seldom appear on the streets other than tidily dressed, and at all public gatherings the neat aspect of the people is very striking. This spirit of neatness unfortunately stops at external show, failing usually to extend within the precincts of the home. Personal independence is insisted upon with an accompaniment of insolence, which is a great detriment to the progress of the people. This spirit is intensified by the ceaseless friction between the negroes and the Mosquitos, the influence of which is to abate the generous impulses of both classes. It is still further encouraged by the ease with which the problem of existence may be solved in a tropical country, which invariably leads to subsistence upon the scantiest and poorest fare, obtainable by a minimum of effort. Thus it happens that necessity for long-continued labor is almost unknown, and service of any sort is usually rendered only as a favor into which one must wheedle the people by infinite cajolery. It is not in appearance merely, but in fact, that the money consideration is the less powerful inducement. Imagination can easily picture the indolence and shiftlessness following naturally from this state of things. How much depravity results from it would be hard to say. There is certainly a strange confusion of moral sentiments, an outward observance of many of the Bible teachings of the missionaries, with a corruption of the inner life which it will take strong efforts on the part of those who have the cause at heart, or a radical change in the population, to extirpate, so deeply is it ingrained in all classes.

Theft is uncommon, and it must be said that the people possess a more than ordinarily keen sense of honor in the discharge of debts, while on the other hand they have no conception of the sanctity of ordinary promises, nor do they regard a contract as binding upon them in any respect. Deceit and falsehood are among their commonest vices. They seldom voluntarily offer assistance to their fellows, but will respond heartily to an appeal for aid. They are usually quiet and well-behaved, except when under the influence of liquor, to the abuse of which they are most pitifully addicted. There is not a merchant on the coast who is not engaged in the sale of intoxicants, which are working the moral ruin and physical degeneracy of the people. It is carried to such excesses that the procuring of liquor is the one object of existence for a large proportion of the population, and it may be said that drink is more directly responsible than any natural proclivities for the indisposition of the people to engage in productive labor. As it is, the work they prefer to do is the odd job that will quickly turn the odd penny with which to buy a glass of liquor. If the importation of liquor were absolutely prohibited, as was contemplated in the Clarendon-Dallas Treaty, it is almost certain that the increased productions of the coast would in a few years double the present volume of trade.

While the general standard of morals is certainly low enough, a still greater depth of depravity is reached in the relations of the family, where conjugal fidelity is practically unknown. So revolting to every sense of decency and rectitude are the monstrosities resulting

from this wide-spread laxity that no discussion of them in print may be attempted, and yet much may be said in palliation of this state of things. It is the direct result of the teachings and practice of the old time buccaneers and rascally adventurers and traders who for two hundred years held control of this coast. What may we expect where pirates, regarded as friends and as superior beings, train the simple savages to rent them women while in port at the price of "a hatchet apiece"; where settlers from Jamaica establish harems; where traders imitate and even out-pirate the pirates? How can we expect to quickly undo this moral damage by the influence and teachings of missionaries, when the Indians had been taught to believe that these pirates and traders were also Christians, and had even received baptism in the name of the Trinity at their hands? The difficulty is increased from the singular circumstance that these miscreants of old, amidst all their villainy and impiety, were sincerely *religious*, devoutly offering daily prayers, and even invoking God to aid them in their works of rapine, theft, and murder. What wonder that the savage mind became confused in matters of religion and morals? Much has been said against Spanish influence over the natives in the American colonies, but it will surely be hard to find a more deplorable condition of moral degradation than that which has been brought about through British domination in Mosquitia. Strange to say, no efforts at reformation were ever attempted by the English Church, although at one time it was proclaimed as the established Church of the Mosquito Coast. Its labors went no further than the main-

tenance of a chapel in Bluefields, in which the service was read on Sundays. In 1845, however, the Prussian Government despatched a commission to Mosquitia to examine and report upon the country with a view to colonization. The report was published in 1847, and proved to be a remarkable document, containing exhaustive and accurate accounts of the climate, physical peculiarities, and productions of the Mosquito Coast, and of its people, their language, customs, and beliefs. The scheme of colonization was soon lost sight of in the midst of more important political affairs, but the report awakened a spirit of missionary enterprise in many German hearts. Chief among those whose philanthropic natures were touched in this manner was Prince Schönburg Waldenburg, who earnestly recommended the Mosquito Reservation to the Moravian Church (*Unitas Fratrum*), as a field for missionary work. The Moravians were already established in many parts of the West Indies, having begun among the negroes of St. Thomas as early as 1732, and having founded stations in Jamaica in 1754, which had accomplished so important a work as to commend them to the sincere respect of the colonial government. Accordingly a reconnoitering visit was ordered in 1847, two Jamaican missionaries, the Revs. H. G. Pfeiffer and A. A. Reinke, being sent over. They bore a letter from Lord Palmerston, which secured them a gracious reception from the chief and the other Mosquitian officials. They were invited by the local authorities to establish mission stations, and were given important grants of land on Rama Island, and in the city of Bluefields. The commission strongly recommended the work to

the General Synod, alleging a partial knowledge and practice of Christian principles on the part of the inhabitants, confounded with a belief in Sukias or Witch Doctors, and the almost universal prevalence of "polygamy" (a mild way of putting it) and drunkenness. In the following year the Synod at Hernnhut decided to enter the new field, and the Rev. H. G. Pfeiffer, with two assistants, was appointed to carry the plan into effect. The work has grown steadily, but slowly. The total number of "adherents" is estimated at about 3400, but those who are familiar with what is termed "adherence" among the negroes in our own Southern States can judge what significance may be attached to it. Still, there is the force of a moral power working in the community, which has wrought many advantageous changes in the last forty years, and which will do more good in the years to come, aided by the influence of increasing immigration from the United States. There are now twelve mission stations in the Reserve, with nine ordained foreign workers, two native ordained workers, one foreign and twenty-one native lay-helpers, and ten foreign and fourteen native women assistants. The missionaries have labored under a great disadvantage in being of German origin, and having to acquire both the English and the Mosquito languages for use in their work; and this detracts, perhaps, more than they are aware from their efficiency. Another detrimental circumstance is the close relation subsisting between the church and the government. The officials and the majority of the population speak of it as the "established" church, and religious observances have assumed in reality a formal character quite

in keeping with what one might expect in a state ecclesiastical institution, although there is actually no relation with the government, unless it may be that which is involved in government inspection of the mission schools. The missionary spirit is more clearly manifest in the stations maintained in the smaller, remoter villages. The missionaries are working with sincerity and earnestness, and enduring hardships and privations through which they can be sustained by nothing less than heroic faith and courage. It may be that they have done the best that could be under the circumstances, but there is observable here that same tendency to attach a large importance to small results, which is so common in missionary fields in all parts of the world.

Reformation of the people in morals is the thing now to be striven for. When a race has for centuries regarded the profession of Christianity as not inconsistent with corrupt practices in the common concerns of life, it is evident that church membership must amount to little, and that pulpit exhortation is unlikely to be of great avail. The most effective method will be to work the leaven of righteousness through the people by the education of the young. The Moravian Church in Mosquitia seems to realize this, and it now maintains ten schools, having an aggregate attendance of about 550 scholars. They are further aided in their efforts by the laws of the Reserve which make attendance at school compulsory, and impose fines upon parents who willingly absent their children. This gives a dignity to the schools unattainable where attendance is secured through persuasion, and as a reflex influence the things

taught acquire a larger measure of respect in the eyes of the old. Ability to read and write is common now among all classes, and the next generation will witness the entire extinction of illiteracy in the Mosquito Coast. The honor for this brilliant result unquestionably belongs to the Moravian missionaries, although it will be claimed by several parties. Nicaragua gave a subvention to Mosquitia, which was to be applied in part to educational matters, but it would be difficult to show that any of those moneys were ever applied in the manner intended. England has boasted her efforts to secure opportunities for the social and intellectual improvement of the Mosquito people. But England has done as much harm as good to Mosquitia, and Nicaragua strove to break up the Moravian movement in 1865 by the imposition of onerous duties upon the goods imported by the missionaries. In this attempt they were aided by the merchants of Mosquitia, who regarded with disfavor the trading tendencies of the church officials. It is not improbable that the good preachers were on the dangerous brink, over which fell so many of the early Catholic missionaries in Spanish America, of abusing the commercial opportunities which arose from trying to improve the natives by the introduction of some of the comforts of civilized existence. The check given to this traffic in Mosquitia was beneficial, and now there is much to hope for as an outcome of the excellent educational facilities which the missionaries are providing, aided by the inspiring influence of a body of noble, God-fearing men and women, setting a conspicuous example of the higher life before the eyes of all. The Mosquito Indians are

quick to learn. They are ready imitators. They aspire to emulate the types which enjoy the favor and respect of the majority. The negro we know to possess a spirit of progress and an ability to receive education, as the results in many of our Southern States have shown. These are the materials out of which Mosquitia's future must be evolved. If not the best in the world, they are far from being the worst, and with the suppression of those vices which now enervate and degrade them, they may easily rank among the superior peoples of Central and South America.

IV.

THE GOVERNMENT AND LAWS.

It may readily be imagined that such a population as now controls the government of Mosquitia would fall into many difficulties in adjusting its legal enactments so as to meet the exigences of its own political existence without straining the narrow limits prescribed by the Treaty of Managua. Astute law-makers indeed must they be who could sail securely between the British Scylla and the Nicaraguan Charybdis which threaten their political safety on either side. Where wise and learned men would be troubled, it challenges no little admiration to observe how a simple and inexperienced people have by childlike caution, at the expense of many dangerous omissions, restrained themselves from overstepping their acknowledged jurisdiction. The entire political situation of the country is anomalous. Nicaragua possesses sovereignty over it, but is powerless to enact a single law affecting it. She has no control over Mosquitia except to restrict its

powers within the treaty limitations. She enjoys absolutely no revenue from this territory which is part of her sovereign soil, except such as may accrue from the sale of postage stamps. Mosquitia enjoys the right of self-government to the last detail, except where there might be involved the exercise of sovereign power. The Emperor of Austria struggled to compose the contradictions of this paradox, and was forced to rudely cut the Gordian knot and award that a non-sovereign portion of an independent state might regulate its foreign commerce and impose duties as it pleased. More than this; perhaps the most singular anomaly of all is found in the circumstance that the inhabitants of Mosquitia are devoid of any legal citizenship. They are defined as "subjects" of Nicaragua, not, however, possessed of citizenship, which can only be acquired when the Mosquito Reserve shall voluntarily submit to absolute incorporation in the Republic. Mosquitia, on the other hand, has no power to grant citizenship, since this would involve the prerogative of exacting an oath of allegiance, which is strictly a sovereign right. Accordingly native birth, or residence for brief periods in the country, gives equal privileges, and disavowal of foreign citizenship is unnecessary for the holding of any office in the government of the Reserve. The only apparent exception is that educational or property qualifications, necessary in the case of most incumbents of office, are not required of those who are denominated "Mosquito Indians," this provision being made in deference to what is now practically a fiction that Mosquitia is "a reservation for the Indians."

The organization of the government is tripartite,

without a distinct separation, however, of the three functions. The executive is usually, but not necessarily, the hereditary Chief, who is elected for life, subject to impeachment. The legislative department consists of a General Council, and an Executive Council, enjoying powers which the title implies. The judicial functions of government are vested in four courts, inclusive of the extraordinary court of impeachment. The supreme court comprises in its jurisdiction the powers of appellate, equity, and surrogate courts. It has original jurisdiction over all cases involving large amounts of money or heavy penalties. Furthermore it is charged with entire control of education. Below the supreme court comes the local magistrate's court, which disposes of all petty civil and criminal cases, and controls the police machinery of the country. The magistrate, by virtue of his police authority, exercises executive functions, and thus he comes to be regarded with considerable awe and respect, and while his opportunities for petty tyranny are ample, he is usually the balance-wheel of the community, serving to hold in check those lawless outbursts which would be frequent but for the existence of an official invested with powers of summary and somewhat autocratic action. As an accessory to the magistrate's court is a sort of tribal tribunal, termed the court of arbitration, which has proved efficacious in a region where settlements are far apart and communication is slow and uncertain. In any civil case the plaintiff and defendant may, instead of carrying the matter into an ordinary court, each appoint an arbiter, and the two thus chosen are to appoint an umpire. This tribunal, being duly sworn before the mag-

istrate, is constituted a court of arbitration, with full powers of a court of justice. Its award is entered in the records of the magistrate's court, and no appeal from its decision is allowed, although an action may be brought against any member of the tribunal in case of fraud, which, if sustained, will set aside the finding of the court. Right of *habeas corpus* is secured by law, as also is trial by jury in criminal cases. Grand juries are abolished, indictments being made at the discretion of the magistrate upon information furnished him, bond being required, however, of the informer. Civil cases are adjudged without the intervention of a jury.

The manner of appointing the Chief, and the General Council, is another tribal feature in the working of the government. A public convention of the "head-men" of the Mosquitos and the mixed population recommends forty-three of its number who shall constitute the General Council. These are duly confirmed by the Chief, who has no power to make alterations. The General Council elects the Chief, and also appoints the members of the Executive Council. In the first public convention under the authority of the Treaty of Managua the old Chief acted as presiding officer until the General Council had been organized, when he was elected according to the constitution. The "head-men" are delegated by local conventions, which are seldom conducted with much formality. It will be seen that suffrage in the true sense of the word is not extended to the masses, although every man may, if he chooses, have a voice in the selection of the "head-men," from whom directly emanates all the power of the government. The system practically

results in suppression of the Indian element. The Indian, although naturally intelligent, naturally as capable as the negro, seems to have less political genius. The machinery of government impresses him as a mysterious something which he cannot comprehend, and which he hates because he feels the pressure of its iron heel when he disobeys its regulations. Instead of seeking to control it himself by constitutional means, he speculates as to methods for out-witting it, or for crushing it. The negroes, on the contrary, respond with enthusiasm to the call for conventions, participate in debate, which is only confusion and more mystery to the Indian, and so, when the sense of the meeting is taken, it is found to be wholly African. The Indian will even vote with the negro, being caught up by the only whirlwind of sentiment which has had force enough to impress the assemblage. As a result the Mosquito men are almost entirely excluded from power, and the government falls easily into the hands of the mixed population, as it is called, consisting chiefly of Jamaicans who still claim to be British subjects. The possession of this power by a single class operates further to make that class arrogant toward the Mosquitos, and the strife at times reaches a high tension.

The Mosquito government, being deprived of sovereignty, has no power to grant titles for land. The only freeholds in the country to-day are those which antedate the Treaty of Managua. Leases for ninety-nine years, with the privilege of extension, are granted instead of titles, and an annual board of land commissioners is given control of this department. The system possesses manifest advantages, as it removes at

one stroke every danger that may arise from faulty titles, and it secures the Indian against impoverishment. A mortgage may be executed against a leasehold, but if foreclosed it cannot alienate the property from the original lessee. The mortgage is satisfied out of the rents or products arising from the property for a certain number of years, after which the lessee resumes the full enjoyment of his leasehold. This rule applies likewise to judgments for debt obtained against the holder of a lease. As the Indian clings tenaciously to his home, and will not sell it, any attempts to dispossess him by encouraging extravagant debts are frustrated by this simple expedient. Another check upon the snares, in which foreign traders so often entangle the simple natives of distant lands, is provided in a law forbidding the transference of freeholds or leases to foreigners until they have resided five years in the country. Foreigners may, however, acquire leases from the government, or may lease freeholds. That the land laws of Mosquitia work smoothly is shown by the universal satisfaction with the system expressed on every side. The power to grant concessions is retained by the government of the Reserve, and while the laws are designed to cover various cases, the principle of the leasing system holds with reference to them also in the majority of instances.

Up to this point the advantages may seem to weigh heavily on the side of Mosquitia. She possesses a form of government which may easily be made liberal and representative. She regulates her foreign commerce, untrammelled by Nicaragua. She is master of her own domain with a single restriction, which has

proven a benefit. But there are other aspects of the situation less rosy of hue. In the first place she is powerless to control her own postal system. This is a sovereign right of Nicaragua, and as Nicaragua derives no other benefit from the postal service in Mosquitia than the revenue from stamps, she is utterly indifferent as to the granting of facilities for the transmission of mails. At Corn Island, once governed by Mosquitia, but now controlled by Nicaragua, the mail steamer must deliver the mails, delay three hours until the inhabitants have had time to answer their correspondence—a matter of importance to an isolated community—and obtain a certificate from the postmaster, on pain of a fine and the forfeit of her subsidy. No such protection of Mosquitia's interests is afforded by Nicaragua. Only one post office, with two branches, is maintained in the Reserve. The postmaster is under no constraint to forward letters to their destination at the smaller towns along the coast. Masters of schooners or steamers receive no compensation if they carry mails, and so the entire Reserve is at the mercy of these men, who take the trouble to go to the Bluefields post office for letters, only as a favor to the merchants whose freight they receive. This uncertainty of communication causes frequent losses to traders, amounting to thousands of dollars annually, and discourages the initiation of new enterprises at any distance from the principal port.

A fresh host of difficulties centres around the currency question. Mosquitia has struggled nobly to solve her problem, but she has found herself tied hand and foot by her old bug-bear, the Treaty of Managua.

Nicaragua insists, as she has a perfect right to do, upon the use of her own currency as the only circulating medium in the Reserve. This currency is the Peruvian "sol," whose value is ever fluctuating, and the paper money of the Republic, which is not readily convertible in a region destitute of banks. The "soles," furthermore, are of no value for remittances to the United States or Europe, so that gold is always at a high premium. At one time the government of the Reserve attempted to make United States and British gold the legal standard of values, but they were forced to recede from this position, and re-establish the "sol." Then they undertook to relieve the capital locked up in fluctuating "soles" by issuing treasury notes, based upon "soles" at 33⅓ per cent., receivable for all government debts, but were promptly called to account by Nicaragua for trespassing upon her sovereign prerogatives. The scheme had failed practically, owing to want of confidence, and had confused local finance, before Nicaragua interfered. Banks of issue are also prohibited by the Republic, and as no bank could exist on the local patronage alone, there is no possibility of rendering foreign exchange an easier matter until some radical alteration of the present regulations has been effected. It would be easy, and consistent with the treaty, for Nicaragua to charter a bank of issue for Mosquitia, with issues secured upon gold deposited in the Nicaraguan treasury, which would infuse new vitality into commercial life on the coast. Her unwillingness to do this, as well as her neglect of the postal system, are probably nothing more than additional examples of her efforts to coerce Mosquitia into annexation.

It would be possible to glean no little amusement from a study of some of the oddities of Mosquitian law, but such humor would meet its own reproof in the patent seriousness of these unskilled law-makers in their struggle to deal justly with their peculiar problems. Still it is necessary to give examples of their simplicity in order to demonstrate that one statute involving serious consequences is not exceptionally incongruous. Owing to certain difficulties with a former Chief, the Councils enacted a law in 1877 setting forth that "All persons giving false or evil advice to the Chief of the Mosquito Reservation . . . shall be liable to be tried for treason or misdemeanor, etc.," which might make it perilous to even converse on political affairs with His Excellency. There is a law prescribing penalties for those who "abuse the authorities"; and by a law of 1889 all the ports and rivers in the Mosquito Reservation are declared "free ports and rivers," which is flatly contradicted by the law providing for the collection of 5 per cent. on the invoices of all importations into Mosquitia, and by the law compelling all foreign vessels to "enter" at the port of Bluefields. It will now be less a surprise, although sufficiently astounding, to know that according to the constitution (Art. IV.) "the laws of England, as the same are now, or may hereafter be known and acknowledged, shall be, and the same are hereby made, the laws of the Municipal Authority * of the Mosquito Reservation, so far as the same can be made applicable to the present and future position, circumstances, and

* It should be stated that the government of the Reserve naturally chose to consider itself constituted a "municipality" under the Treaty of Managua.

form of authority, and when the same shall not be inconsistent and at variance with the sovereignty of Nicaragua." In accordance with this the supreme court is now using Serjeant Stephen's "Commentaries on the Laws of England," Butterworth's edition, 1890, as its standard. Expatiation upon the bewildering tangle resulting from the recognition of three legal authorities, emanating from three different nations, all which must be harmonized in their application to the common affairs of life, is a needless task. Doubtless the proverbial talents of the legal fraternity of the Quaker City would prove inadequate to ascertain "the law" on any given subject under such conditions. One can understand that resort to the court of arbitration would be preferable under all circumstances to falling into the meshes of the law in the ordinary courts, where the meshes are so complicated. But a court of arbitration is only adapted to the needs of a somewhat primitive community. The present conditions render it practically impossible to forecast the legal status of any enterprise in Mosquitia, and until this obstacle, the only serious one her own folly has imposed upon herself, shall have been removed, there will be great difficulty in inducing capital to enter the country. Dependence upon her own laws, imperfect as they may be, limited by Nicaraguan sovereignty, would be infinitely preferable to the existing indeterminate mixture.

V.

The Outlook for the Future.

The pulse of a new life is so manifestly quickening every portion of Spanish America, that we should nat-

urally expect to find its influence working changes on the Mosquito Coast. The influx of foreigners, though slow, has been gradually increasing within the past ten years. Many of these new accessions have been merchants and artisans from the United States, who have caused the introduction of some improvements and reforms which have modified the old conditions. The drift of emigrants from Jamaica, which for near two hundred years has been setting like an ocean current toward the Mosquito Shore, continues unabated. From this source little benefit is derived, but the newcomers bring with them a certain respect for the superficial gloss of civilization, and are readily brought into kindly temper toward reforms under the guidance of skilful leaders. They bring with them, moreover, uncompromising British prejudices, and a cordial antipathy toward those of Spanish blood. Thus the old fires of hatred, kindled in the early conflicts between the Spaniards and the Mosquito Indians, have been stirred through multiplying decades, and are each day brightened more and more. To the wealth of the community these people add almost nothing, but as they congregate chiefly in Bluefields, they gradually come more or less under the influence of the modern commercial movement, which represents the nearest approach to a healthy development the coast has yet experienced Unfortunately the possibilities of this new movement are so narrowed by Mosquitia's political limitations, that a point in her progress beyond which she cannot pass will soon be reached, unless her powers are in some manner extended.

The present sluggish population will never of itself

acquire the inspiration of frugality and thrift. If developed in them it will come largely through the friction of competition with hard working emigrants, but nothing short of a rapidly expanding trade will induce such emigrants to seek their fortunes in the Mosquito Reserve. There is lacking, moreover, the spur of patriotism, incident upon citizenship, to impel the people to strive for national advancement. The future of the country is entirely indeterminate. Politically she is, as the old saying has it, "neither fish, flesh, nor good red herring." The influence of this is to dampen the ardor of many who would otherwise render valuable aid to the country's development. On every side one will hear men whose political services would promote the well-being of the commonwealth excusing their apathy on the ground that they intend to remove to other countries as soon as they have amassed a larger fortune, and many men and much money have thus been practically driven from the Reserve. They would rather adapt themselves to faulty laws for a time than undertake the thankless task, the almost hopeless task, of remedying defects which in large part are inherent in the political conditions established by treaty.

In spite of all her drawbacks Mosquitia possesses some conspicuous advantages which must not be overlooked. Deprivation of sovereign powers gives her complete immunity from disturbing foreign relations. She may neither send nor receive envoys, nor enter into any conventions with foreign governments. At the same time she has an implicit guarantee in the Treaty of Managua against being affected in any manner by political changes or disturbances in Nicaragua.

The simplicity of her government renders its maintenance inexpensive. The highest salary paid is one of 3000 "soles" to the chief, equivalent to about $2100. The salaried officials are comparatively few, and the perquisites of office are small. Taxes are consequently low, the support of the government accruing from the five per cent. import duty, license fees for business ventures, rentals from leaseholds, and a two "soles" poll tax on all except Mosquito Indians. A third advantage lies in the fact that the whole population is free, and the system of "peonage," so inimical to progress in most Spanish American states, has, after a long struggle, been abolished. In 1883 an act was passed outlawing all debts not collected prior to March, 1884. To prevent a relapse of the old state of semi-slavery in which the traders were wont to keep the Indians, this act was amended to impress debtors, upon motion of creditors, into the service of the government at fifty cents a day, one half of that amount being paid to the creditor until the claim is satisfied. This is the last vestige of "peonage" in Mosquitia, and even this is not rigidly enforced. The labor problem is as trying on the Mosquito Coast as elsewhere. Laws have been enacted to mitigate its evils, but always without effect. After many futile expedients the merchants and agriculturists are still forced to procure laborers by infinite coaxing and persuasion, after the manner usual in dealing with primitive people. Enterprises of any magnitude are necessarily conducted with the aid of imported labor, and the government has adopted a regulation regarding such immigrants, which in principle is wise and highly meritorious. Contract laborers from

abroad require to be registered, to pay a small fee, and to give bond for their good behavior during a specified period. Such a law might with great advantage be extended to apply to all immigrants, which would save Mosquitia from the danger of adding further increments of undesirable Jamaicans to her already too shiftless and sluggish population. Indeed it is not at all improbable that some similar regulation might with important benefits be applied in other countries perplexed with immigration problems.

Nature has, moreover, blessed Mosquitia with the excellent harbor of Bluefields, and with deep water up the Bluefields river to a point where high land begins, reaching down from the mountains in the west. The project for building a railroad from this port across to San Miguelito on Lake Nicaragua has much to commend it, and if the road should be built it would unquestionably capture the carrying trade between the coast and the interior of Nicaragua. Greytown, as is perhaps not generally known, is to-day nothing more than an open roadstead, and the Rio San Juan del Norte is so obstructed by rapids as to render navigation both difficult and expensive. Bluefields has everything in her favor, and by establishing rail communication with San Miguelito she would become the great port of Nicaragua, in which competition with the San Juan route the Republic would be a gainer equally with the Reserve through the opening up to colonization of many hundreds of square miles of valuable virgin territory.

Both the Republic and the Reserve have also much to gain through a rearrangement of their mutual polit-

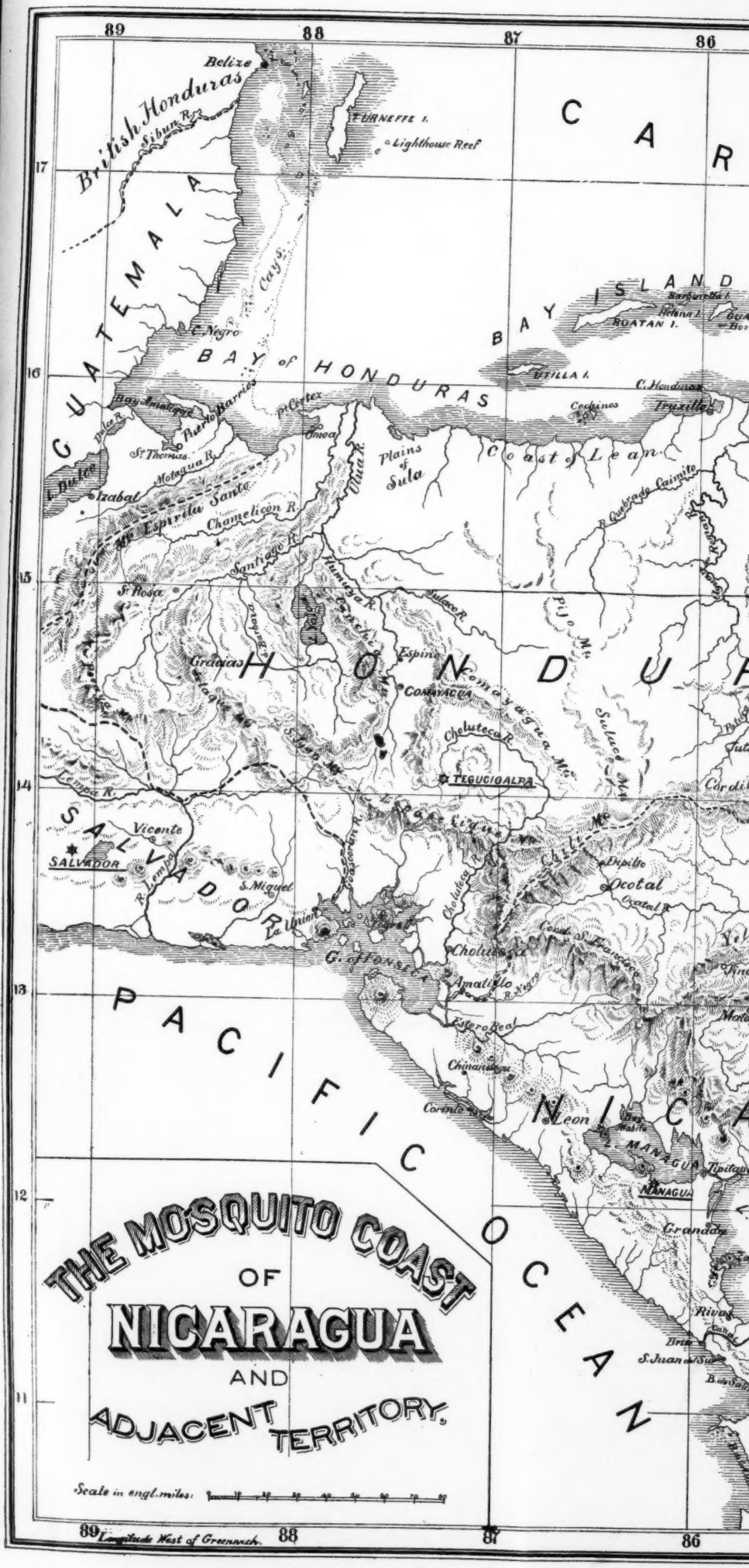
ical relations. Nicaragua has ever cherished the hope of acquiring full sovereignty over Mosquitia. To this end she has employed every artifice of persuasion and coercion to induce the people of the Mosquito Coast to exercise the right of absolute incorporation into the Republic accorded them by Article IV. of the Treaty of Managua. These efforts have not only been stoutly resisted, but they have tended to intensify the hostility which has always existed between the two sections. Although there may be no such thing as a Mosquitian patriotism, there is a bond, distinctly national, binding all classes together in the common anti-Spanish sentiment. If Nicaragua would dispassionately study the situation, she would perceive the utter hopelessness of effecting the annexation she so earnestly desires. That she should seek it is not unnatural, and that she can justify her pretensions on the ground of former Spanish sovereignty over the coast is incontrovertible. But she has lost her opportunity forever. Of that there can remain no doubt. The sooner she realizes it, and sets about improving the relations between herself and her nominal ward. the sooner will both enjoy a larger measure of happiness and prosperity. While much good might be attained by Nicaragua simply extending the powers of Mosquitia, in return for which she might be accorded certain compensatory advantages by the latter, it is evident that better results could be accomplished if Nicaragua should take the initiative in negotiating a new treaty with England to supersede the Treaty of Managua. What Nicaragua could rightly insist upon would be the absolute cession to her in perpetuity of the regions, formerly claimed by Mosquitia,

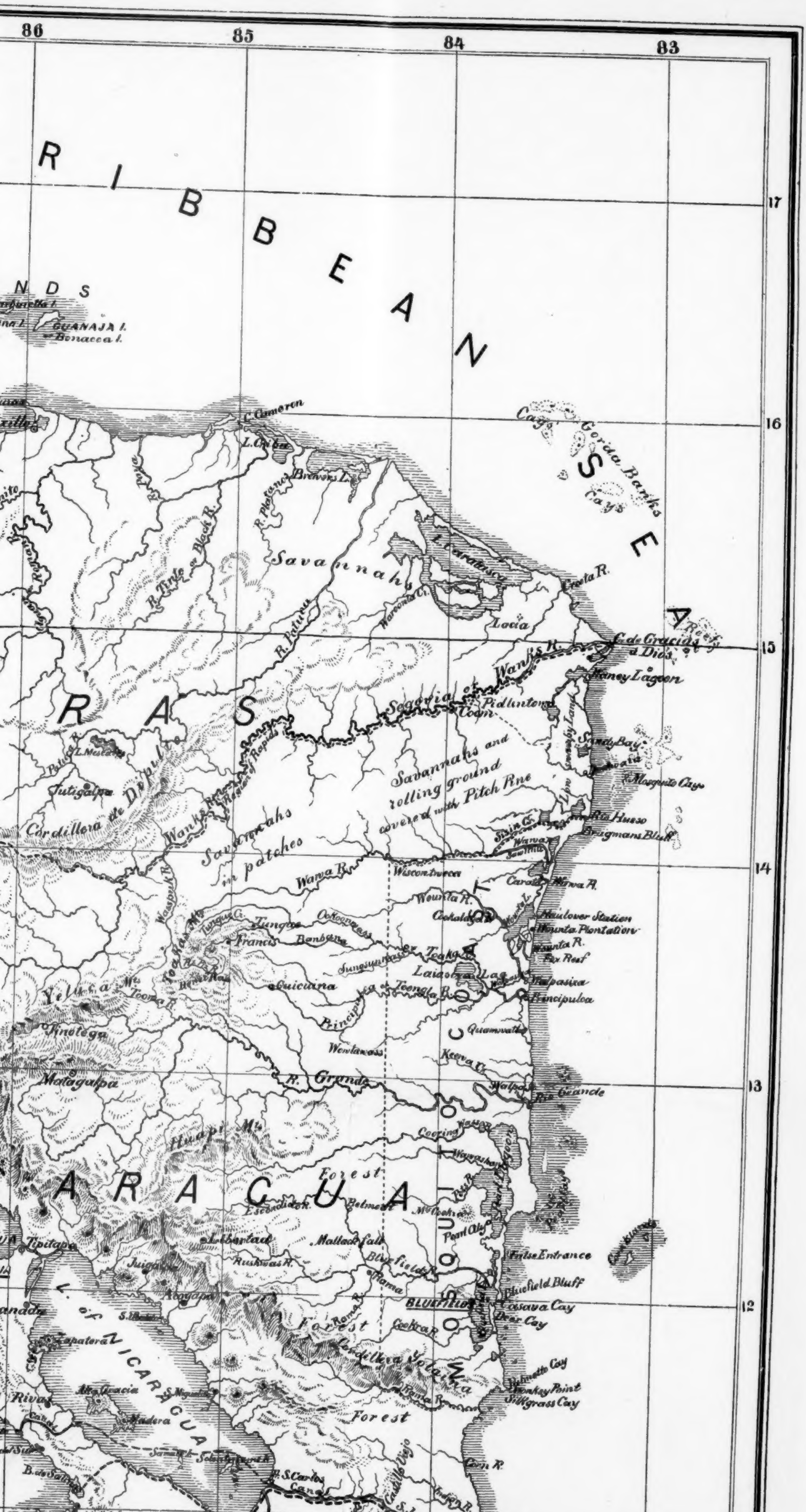
adjacent to the Rio San Juan del Norte on the south, and to the River Wanks on the north, relieving her from her present decidedly precarious tenure under the Treaty of Managua. In addition she has the strongest reasons for demanding such powers in Mosquitia as will protect her from the embarrassments and dangers attendant upon the authority now assumed by the government of the Reserve, whereby foreign shipping and foreign citizens may be subjected to disabilities and infringements of their rights, responsibility for which acts rests entirely upon Nicaragua as sovereign, while she is powerless to prevent them. An aggravated case of this nature has lately arisen in which United States shipping suffered, which if not already engaging the attention of this Government must do so shortly, perhaps with the result of reviving the Mosquito question between the United States and England. The constitution of Greytown as a free port is amply provided for in the Dickinson-Ayon Treaty of 1867, independently of that of Managua, although England's fears on this point might be set at rest by a separate convention between the three countries most deeply concerned. On behalf of Mosquitia, Nicaragua might, with advantage to all, establish by treaty the status of the Mosquito Indians, which practically means to-day the whole mixed population of the Mosquito Coast, on a basis similar to that of the Indians of the United States prior to 1871, for which she contended in presenting her case for arbitration of the Treaty of Managua in 1881. This would involve the right on the part of Nicaragua and Mosquitia of adjusting their mutual relations from time to time, as changing conditions might demand, by the

negotiation of treaties between themselves. It might also naturally lead to each maintaining an envoy or agent at the government of the other, which would promote a good understanding between them, and facilitate friendly commercial intercourse. The interests of both would also be subserved by the creation of a Mosquitian bank of issue, secured by gold deposits in the Nicaraguan treasury. The postal system of the Mosquito Coast should also be placed under local control so far as relates to the establishment of post-offices and mail routes.

The semi-national position thus secured to Mosquitia, with enlarged powers and closer and more cordial relations with Nicaragua, would lead to important results in her commercial and industrial condition. She would feel a strength within herself, an incentive to higher attainments, which are now impossible. Mosquitia has suffered the hardships of a mock independence for centuries. She has had no other history than that of a dupe in the hands of intriguing powers, who have deftly shorn her of her rights and her dignity in causing her to play a part not her own. At last, on the eve, as she supposed, of a signal aggrandizement in the acquisition of new territory and increased greatness, she found herself cast into a position of political inferiority little better than absolute subjection. The status then assigned her was regarded as merely temporary, but the avenue of relief is one which offers her no assurance of improvement. She fears, and with abundant reason, that the desire for annexation on the side of her nominal sovereign is conceived to a large extent in the ambition of politicians who regard the

people as for the government rather than the government as for the people. The temporary status has proven unsatisfactory. The opportunity is now open for Nicaragua to confirm her expressions of interest in the welfare of the Mosquito Coast by recasting this political anomaly in a better mould, in doing which she would equally consult her own advantage, and honor herself in the prosperity and new vitality she would bring to her long crippled dependency.


THE MOSQUITO COAST
OF
NICARAGUA
AND
ADJACENT TERRITORY.
Scale in engl. miles:
Longitude West of Greenwich.
89
88
87
86
17
16
15
14
13
12
11
Belize
British Honduras
Sibun R.
Triangle I.
Lighthouse Reef
GUATEMALA
C. Negro
BAY of HONDURAS
BAY ISLANDS
Roatan I.
Utilla I.
C. Honduras
Cortez
Omoa
Puerto Barrios
Motagua R.
Izabal
St. Thomas
Plains of Sula
Ulua R.
Coast of Leam
Chamelicon R.
Santiago R.
Gracias
HONDURAS
Comayagua
Chelutecca R.
TEGUCIGALPA
Espino
Sulaco R.
Pijo Mt.
Sulaco Mts.
Tinto R.
Lempa R.
SALVADOR
Vicente
S. Miguel
La Union
G. of FONSECA
Choluteca
Amatillo
Estero Real
Chinandega
Corinto
Leon
MANAGUA
Granada
Rivas
S. Juan del Sur
PACIFIC OCEAN


86
85
84
83
17
16
15
14
13
12
11
R I B B E A N
S E A
N D S
GUANAJA I.
Bonacca I.
C. Cameron
Brewers L.
Savannahs
Cays
Gorda Banks
Cays
Cruta R.
Reefs
C. de Gracias a Dios
Haney Lagoon
Wanks R.
Segovia or
Pidlintown
Coom
R. Patuca
R. Tinto or Black R.
R A S
Savannahs and rolling ground covered with Pitch Pine
Sandy Bay
Mosquito Cay
Rio Husso
Brugmans Bluff
Wawa
Juticalpa
Cordillera de Depilto
Savannahs in patches
Wawa R.
Wiscontuwca
Waunta R.
Haulover Station
Waunta Plantation
Waunta R.
Fox Reef
Walpasixa
Principulca
Tungas
Bonbana
Quicuina
Principulca
Laiasra
Quamwatla
Wenlawass
Yellow Mts
Jinotega
Matagalpa
R. Grande
Rio Grande
Huapi Mts
Forest
A R A G U A
Escondido
Belmont
Mallado falls
Rushwas R.
Bluefields R.
Tipitapa
Juigalpa
Acoyapa
False Entrance
Bluefield Bluff
Cosawa Cay
Deer Cay
BLUEFIELDS
Forest
Cookra R.
Cordillera Yolaina
L. of NICARAGUA
Granada
Zapatera I.
Rivas
Madera
Forest
Palmetto Cay
Monkey Point
Pigrass Cay
Corn R.
S. Carlos
Castillo Viejo
S. Juan del Norte
Greytown
Colorado R.
C O S T A R I C A
Design. by Christ. Weber 21 Beekman St. N.Y.

THE WILD PEOPLES OF FARTHER INDIA.*

BY

C. W. ROSSET, *Freiburg in Baden.*

Farther India belongs to the less explored regions of the earth, and certainly very little is yet known of that portion which lies within the French sphere of influence; the district, that is to say, which stretches from the Mekong River to the coast of Anam. In the country directly dominated by them, the French have assuredly done all that was possible to supply exact information concerning the geographical and ethnographical peculiarities of these lands; but their explorations, as a whole, have been confined to the coast region, to French Cochin-China and Cambodia, and to the coast of Anam. The interior has so far been treated with neglect, because of the impracticable nature of the ground and the difficulty of access. Within the limit of his ability, the writer of these lines has made new contributions to the geography and ethnography of these districts, including a detailed map of the population.

The country now under consideration lies between the meridians of 106° 20′ 15″ and 108° 20′ 15″ East of Greenwich and the parallels of 11° and 13° North Latitude.

Besides the Mekong, which, for the width of its bed

* Translated from the author's MS.

and the length of its course, may well be classed with the giant rivers of the world, one of the larger streams which fertilize these regions is the Donnai. This has its source in the mountains of Anam and flows from the northeast to the southwest in a line parallel with the coast, till it enters the sea somewhat to the eastward of the Mekong, and through a broad delta like that of the greater river. Near the Donnai is the Song Be, which comes from the north. Following this river upstream the explorer reaches under the 12th degree of latitude the country of the Stieng. To the north of these people live the Beunong, and to the east the Ahong, while the Nhong tribe has its home still to the east of the Beunong.

The climate of this country is altogether tropical. The whole Indo-Chinese peninsula is under the influence of the monsoons, and on the regular interchange of these depends, as in India itself, the orderly recurrence of the wet and the dry seasons. The mean temperature for the year varies between 25° and 27° Cent. (77° and 81° Fahr.). The dry season, from December to April, is characterized by a great drought, so that the grasses are scorched by the sun and the plains of the interior are, so to speak, in flames, with great forest and prairie fires over the country, partly the result of accident, but in part the work of the savages, either to provide a way for their passage, or to clear an open space for their rice fields.

The rainy season begins in May and lasts till September; and the rivers, which in the dry season run low and disappear, now rise above their banks and overflow the country for miles in width. At this time

the vegetation assumes a most luxuriant appearance; where lately stretched a bare and desolate surface, covered with ashes, everything is green and full of life, and the giant grass, which is characteristic of the country, attains in a few weeks a height of several metres.

While in the plains the difference of temperature between the day and the night is only of a few degrees, there is now in the mountain valleys during the day a heat of 35° Cent. (95° Fahr.), which falls to between 5° and 10° (41°–50° Fahr.) at night.

Provided with this overflowing supply of water, the land produces the distinctive tropical growths in greater abundance than the Indian peninsula. The rice culture is extraordinarily developed, and the people plant also sugar-cane, pepper, cardamoms, cotton, and superior tobacco; and the tropical fruits, pine apples, oranges, and the like, come to perfection.

The mountains are clothed with the most luxuriant, impenetrable forests of precious woods. The teak furnishes ship timber; and among others are the banana, the sandal-wood, ebony, Indian fig, bamboos of different species, many kinds of palms, dye-woods, olives, gum-trees, the Areca palm and the mulberry.

The animal world is also extraordinarily rich, and presents the same character as in India. Especially to be mentioned are the huge and extremely dangerous elephants which, unlike those of Ceylon, quietly lie in wait for the hunter and charge directly upon him; the black bear; the magnificent royal tiger, of larger size than that of Bengal, but not so fearless of men; herds of buffaloes; the golden-yellow, short-haired wild cow; the Dugong cow, on the upper Mekong, with its breasts

resembling those of women; many kinds of wild cattle, deer and swine; peacocks, pheasants, and other fowls; apes, crocodiles in greater variety than I have seen them in the White and the Blue Nile or in the Ganges, and swarming with these on the waters, storks, cranes, and ibises; great butterflies; insects, and among these, ants, happily numerous and destructive to other insect life; pestilent mosquitoes, and a grievous scourge, fortunately known only in the rainy season, the leeches, which find their way unnoticed into the flesh, for even high footgear cannot keep them out. They crawl steadily up over the clothes and suddenly make their appearance on the upper parts of the body. The simplest way to protect oneself is to go with the feet and lower legs bare, and to scrape the leeches away, when they have taken hold, with a bamboo knife, from time to time.

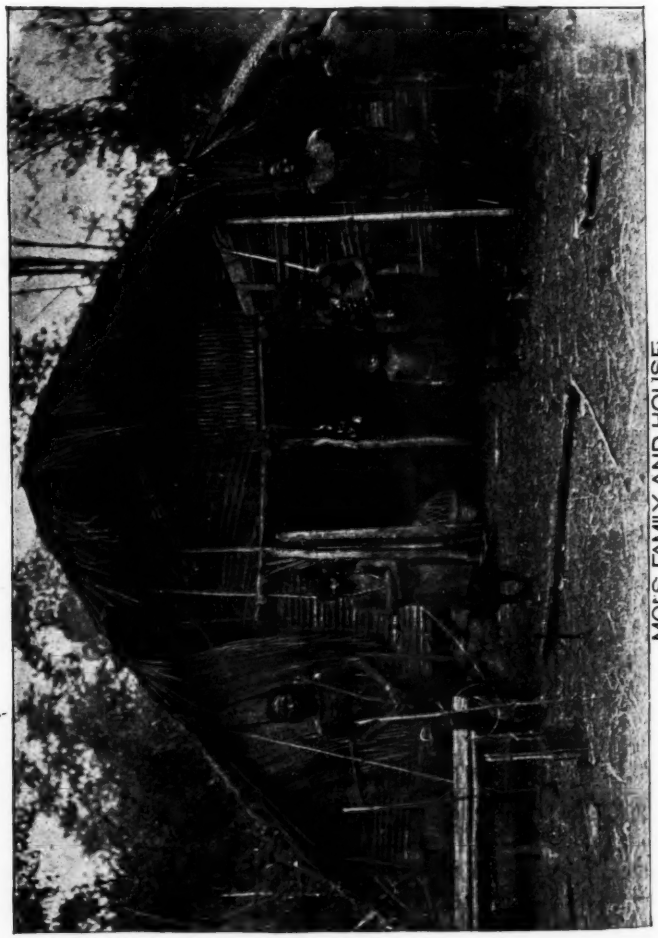
In undertaking to describe any one of the peoples already named, the writer finds himself in the unpleasant position of being obliged to repeat, in each case, a great deal that he has previously said. For notwithstanding the manifold differences in manners and customs, in their living and their pursuits, in character and language, between individual tribes, there prevails among them all, taken as a whole, a very great similarity.

Northwestwardly from the coast of Anam is the home of the Moïs. The name indicates not a single people, but a union of several related tribes which differ among themselves in speech and customs and mode of life. The French distinguish the *Moïs dépendants* and the *Moïs indépendants*. The latter dwell in the far

interior of the country in the most out of the way places.

The territory inhabited by the Moïs is situated on the left bank of the Donnai, in the Anamite mountain chain. The dependent (*dépendants*) Moïs established themselves on the open plateaus, surrounded by high forests, while the independent, or Moïs *indépendants*, set up their dwellings in the densest bamboo thickets of the interior. The form of their huts is characteristic, and a single one lodges a whole village. The building is 80 metres (262 feet) in length, and rests on a foundation of bamboo piles. The walls, which consist for the most part of canes, are not upright, but slope from below upward. The roof has the general form of a gable roof, so that the section of the whole dwelling gives the form of a pentagon resting on a square. Under the roof is the granary, and below the dwelling, between the bamboo piles, is the stable, in which are kept the pigs and the fowls, and, in the rainy season, the cattle. Huge Chinese jars adorn the interior.

The clothing of the Moïs is composed of a cloth band around the hips, about 20 to 30 centimetres (8 to 12 inches) in width for the men, and for the women reaching to the knee. Their color is, on the body, a clear brown; in the face, olive. The hair, which is black and sometimes crisp, is always worn long and twisted in a knot behind. The beard is removed with a kind of pincers, carried about the neck. The eye is not Chinese, but horizontal. The head and brow are high, and the cheek bones prominent; the upper part of the nose is depressed, and the *alæ* are short. The Moï wears in his ear a short piece of bamboo filled with



MOI'S FAMILY AND HOUSE.

tobacco, so that he is always provided with the material for a cigarette, for he is passionately fond of smoking.

He lives principally upon rice, which he himself cultivates, and, when times are hard, upon wild sweet potatoes which grow plentifully in the woods, though at a depth of three feet, so that it is a labor to dig them up.

He eats flesh also, either that of his own pigs and cattle, or that of the game which he kills with a cross-bow. Neither does he refuse to eat monkeys and the gigantic lizard (Hydrosaurus Salvator). His industrial activity does not amount to much, for, like all the Indo-Chinese peoples, he is shamefully lazy.

The clothes in use are made by the wild Moïs and are very durable, but the preparation of a woman's garment often requires months. In many instances the clothes are decorated with brass, for both men and women are fond of finery, even of the strangest sort. The brass wire and other articles of barter, such as tobacco, betel, pearls, etc., and salt, the most prized of all, are obtained by the Moïs from the Anamites. Only the dependent Moïs on the frontier are acquainted with gold.

Several families of the same village live together in one hut; each one has its own division, where it cooks for itself, and as there is no chimney, the hut is filled with smoke. The Moï belongs, moreover, to the most uncleanly tribes of Indo-China; and the treatment of the dead is a striking proof of this.

The corpses, which in that climate decay rapidly, remain for days in the living room while the women wail and make lamentation about them; and when at last the body is borne to its last resting-place in the forest, there is never any cleaning of the hut, but on the very mat where the sick man died another lies down to sleep without hesitation.

Under these circumstances diseases like the cholera and small-pox and skin diseases have free play among the Moïs, and their recklessness invites their extinction. *Shum-shum* (rice-spirit) drinking bouts are very frequent, either at the burial services or when sacrifices are offered to the souls of the beasts, elephants, tigers, etc., which they have killed; for the Moï belief is that the souls of the animals continue to inhabit the woods and that, if not propitiated, they will do great damage to their slayer. For every beast the Moï possesses a particular symbol, either something taken directly from the animal, such as a tooth or a horn, or something fashioned out of bamboo, to which he is able to give the different forms he desires.

The Stiengs are held by some to be the original inhabitants of this land. They formerly occupied the coast region and were driven back into the interior. The Stieng is ready to die rather than abandon his mountains and woods, and his love of freedom is so great that even at the cost of his life he seeks to escape from any kind of confinement. In early times these people lived upon the chase and the forest fruits; now, where they begin to feel the French influence, they devote themselves, in a greater degree than the other tribes, to the cultivation of rice, so that they are in a position to furnish this grain to their less agricultural neighbors.

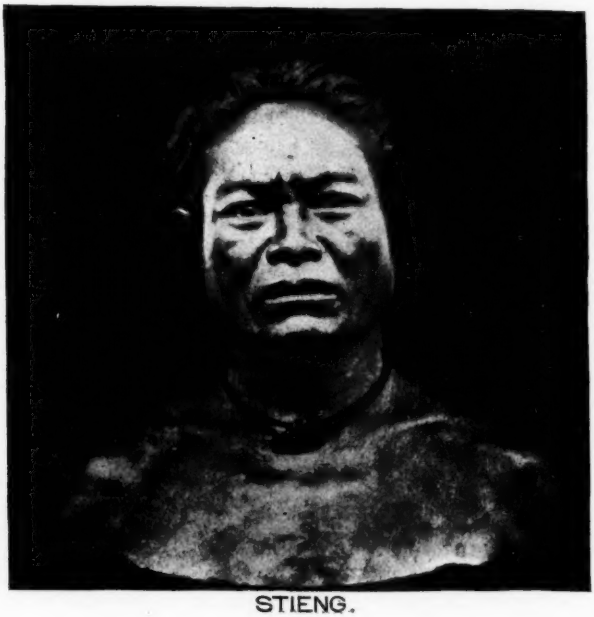
They fabricate various articles of iron, for which they procure the raw material from the Kouïs, once also a wild tribe, but now mingled with the Cambodians. Their territory lies about sixty miles northwest of Sambor and contains very rich iron mines. As in the other tribes, the women weave cloth; and the Stieng basket-

work, especially in panniers, is very fine. Among

STIENG.

all the tribes of the interior they are the least advanced in culture, but they are courageous fighters

and are constantly engaged in hostilities with their neighbors, the mountain Beunongs, the Ahongs and Nhongs. Twice a year they burn the grass, which grows luxuriantly around their settlements, in order to secure themselves against a surprise on the part of some



STIENG.

strange tribe, which might creep upon them unawares under cover of the tall grass. It is a sign of the Stieng's warlike inclination that he carries a sabre, which he himself fashions out of iron. His fights are principally for the purpose of man-stealing, and the captives are sold as slaves to the Cambodians, the people of Laos and

others, or to their neighbors who are on friendly terms with them, but the highest price is paid by the first; and the Stiengs take brass wire, salt, tobacco, etc, in exchange for the slaves. The price for young girls of from 10 to 18 years varies between 10 and 50 dollars, of 75 cents each.

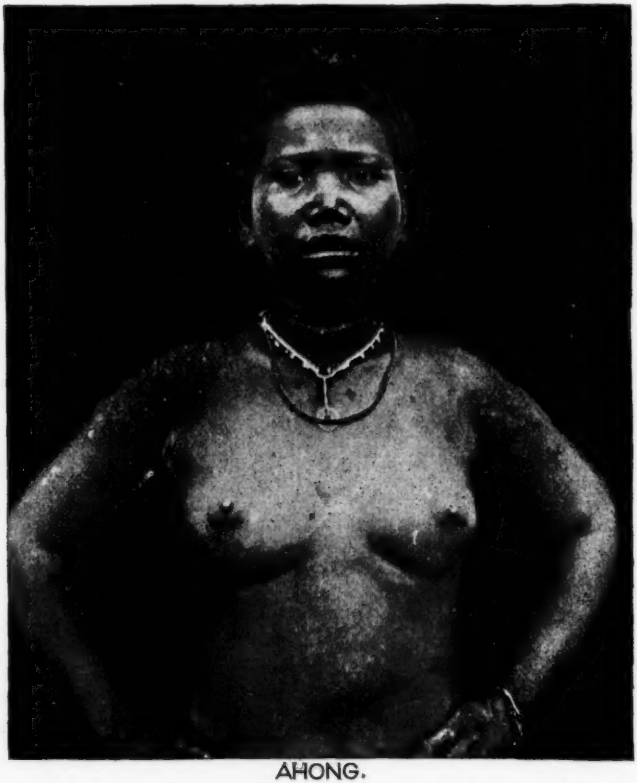
Although continually on the move, the Stiengs are not properly a nomadic people, for they travel round within their own territory.

Like the Moïs, the Stiengs are generally content with one wife, only the rich and the chiefs possessing two, or more. Their huts also resemble those of the Moïs, and it is often the case that several are grouped together.

The domestic animals are sheep, goats and buffaloes, the flesh of which is eaten, and generally half-cooked, for the Stieng cannot wait till the meat is done. It is cooked with fresh aromatic leaves in a bamboo tube, which serves only for the one occasion.

The substantial difference between the Ahongs and Nhongs is only in their language. They are the handsomest race of the country, with a great conceit of their own good looks, and adorn themselves more than their neighbors. They wear variegated head-bands with pearls, several necklaces hanging down on the body, and strings of pearls even on their hips, so that they make a pleasant impression upon the Europeans. Especially remarkable is the manner in which the white, yellow, red and black pearls are distributed in regular order; and a marked preference is shown for the arrangement of black, white and red, in succession. On the dark brown skin these pearl ornaments produce a charming effect. On account of their physical advan-

tages the Ahongs and Nhongs are exposed to the greatest dangers from the slave-hunters, as merchandise of the highest price. They are good-natured and

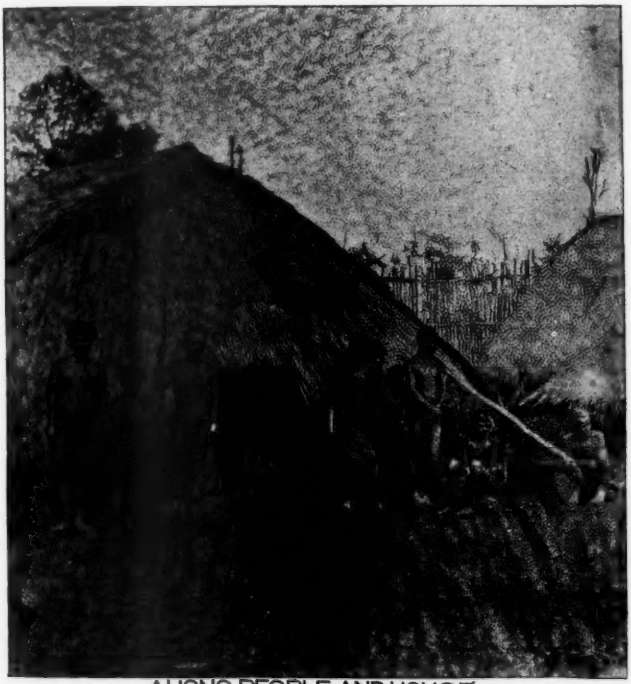


AHONG.

obliging, and, in spite of their simple diet, full of endurance, and they win the sympathy of the European in a high degree.

The Beunongs, like the Moïs, are divided into the

dependent and the independent. The former, who are in Cambodia, which is French or at least subject to the French influence, number only about one thousand, and are kept in leading-strings by the Cambodians to



AHONG PEOPLE AND HOUSE.

such a degree that their original brethren, the independents, are content to know nothing about them, and even make raids to capture them for slaves. In the style of their houses and in their dress the Beunongs have copied much from the Cambodian, who despises

them and takes advantage of them to a lamentable extent. They furnish him with horns, skins, deer antlers, and ivory, in exchange for salt, tobacco, betel nuts and betel leaves, cloths, brass wire, and pearls; but the Beunongs are cheated in the most shameless

OLD WOMAN BEUNONG.

manner in the trade. There is compensation for him in slave hunting among the neighboring tribes, since the Cambodian pays high prices for slaves. The Beunong prefers this easy way of coming by property to the tedious labor of agriculture and the frequently poor returns of the chase. It is no wonder, then, that the man-hunter flourishes to perfection in these regions.

The independent Beunongs have nothing to do with

the Cambodians. Their huts consist for the most part of a gable roof, sloping down to the very ground; and under the higher portion of the roof is the corn loft. A single house rarely contains more than one or two families; and three or four houses form a village, which is surrounded by a bamboo barricade, built so close that not even a cat can get through it. Thorn bushes and bamboo stakes, planted in the ground and sometimes poisoned, further secure the entrance to the village. The Beunong is always in dread of a hostile surprise, and for this reason the men who are able to bear arms usually sleep outside of the fortification, with their provision sacks on their backs and their cross-bows beside them. These cross-bows will drive an arrow even through the elephant's hide. The Beunongs live on the products of the chase, sweet potatoes and roots. They cultivate Indian corn and tobacco, and procure their rice from the Stiengs. Their clothing, which is more ample than that of the Moïs, is of their own make and extremely durable, and is adorned with brass wire worked in on the loom. With the Europeans the Beunong is friendly and obliging, not at all dangerous, but yet extremely suspicious; and his visitors can give him no greater pleasure than by taking themselves off with the least possible delay.

GEOGRAPHIC NAMES OF ANGOLA, WEST AFRICA.

BY

HELI CHATELAIN,

Late U. S. Commercial Agent at Loanda, West Africa.

The map which accompanies this article is the one announced in my report on Angola, published in No. 147 of U. S. Consular Reports, and it completes the general map of Angola, illustrating said Consular Report.

As now enlarged by treaties with Germany, Great Britain and the Kongo-State, the Portuguese Province of Angola stretches from the Kongo to the Kunene River and from the Atlantic to the Kassai River. But the Angola nation, of Bantu stock, occupies only the region between Loanda and the Kuangu River from west to east, and between the Lifune and Longa Rivers, from north to south, expanding north and south toward the interior. Its area is very nearly covered by the present map.

The cartography of Angola, like that of all Central Africa, is yet in its infancy. There is no satisfactory map of the Province, nor of any portion thereof. The map of Angola, just published by the Commissão de Cartographia of Lisbon, though beautifully got up, bristles with misprints of names, and fails to give any additional information to that in previous maps.

The only points determined by scientific observations are found along the coast, and on the routes of the

Portuguese and German explorers who have gone from Loanda to Kassanji and up through the (Ngola) country. All the locations in the left Kuanza basin and on the Longa River are simply guess-work. Nor are the locations between the Loji and Mbengu Rivers as reliable as they should be, considering their vicinity to Loanda.

In regard to this map, and all other maps of Central Africa, it may be well to state a few cartographic points, very little known.

(1) The names of countries, tribes, rivers, mountains and localities are almost invariably mis-spelled and mis-pronounced; because the travellers who jotted them down, and the cartographers who reproduced their maps, were no linguists, and because there is no standard system of transliteration commanding universal adherence.

(2) The names given by travellers are generally those furnished by their native guides and carriers, frequently nick-names, and always adapted to the phonologic characteristics of their dialect. The correct name, used by the people of the place or the ruling language, can only be obtained by a resident having a fair knowledge of the local language.

(3) The rivers and mountains are the only reliable, unchangeable landmarks. But their names, in Bantu Africa, are so little varied, that within a radius of fifty miles two mountains, or two rivers running in opposite directions, may bear the same name; and within a radius of a few hundred miles half a dozen rivers or mountains of the same name may be found. Travellers also frequently mistake the generic for the proper name.

(4) The names of native towns and villages are, with very few exceptions, those of the respective chiefs. These do not change with each successive chief, but, like that of Pharaoh, belong to, and are inherited with the office. But the residence of the chief (and site of his village) is either systematically changed after each chief's death, or is subject to fitful transfers owing to the injunction of the diviner, or medicine-man. An African village is still essentially a camp of grass tabernacles.

(5) It is remarkable that, although villages are constantly shifting, and tribes are displaced by wars and commercial pursuits, there has been next to no important change in the habitat of Central African nations within the four hundred years since the discoveries of the Portuguese brought them within the sphere of authentic history. The movements are within a circle.

(6) As every Bantu noun belongs to one of about ten classes, with a different prefix for the singular and for the plural, and as every Bantu tribe or nation has a different set of prefixes, it is evident that only the linguist who has made a comparative study of the Bantu-languages can find his way in the maze of conflicting names, and that a few decades of hard linguistic research must elapse before a satisfactory accuracy can be attained for the whole Bantu-field. Linguistic geographers and geographic linguists must take up one field after another as a specialty, and the geographical societies ought to encourage them in this needed and arduous undertaking.

Excepting a few names of places in the regions

visited by me, or about which I had gathered original information, the present map contains no new geographic names. It is for the most part an eclectic combination of previous special maps, partly rectified.

Its novel feature is that all the names are carefully written as pronounced by the natives of Angola and spelled in accordance with the phonetic orthography adopted in their rising literature.

The pronunciation of Ki-mbundu, the language of Angola, is as follows:

All the vowels as in Italian, *e* and *o* with the open sound. Followed in the same syllable by a vowel, *u* and *i* sound like *w* and *y*. The consonants as in English, except *g* (always hard), *j* as in French, *s* (always sharp), *x* (=sh in English).

The following lists show the difference between the native names and the customary Portuguese spelling and pronunciation:

NAMES OF COUNTRIES AND TRIBES.

KI-MBUNDU	PORTUGUESE	KI-MBUNDU	PORTUGUESE
Musulu	Mosulo	Ma-kioko }	Quiocos
Mutemu	Motemo	Kibokue }	Quiboco
Mbamba-Mbuila	Bamba Ambuila	Ma-Xinji	Xinges or Chinges
Ma-hungu	Mahungos	Ndulu	Andulo
Ji-ndembu	Dembos	Mbulama	Bolama
A-bidi	Mubiris	Haku	Haco
Kakulu-Kabasa	Caculo Cabaça	Kibala	Quibala
Ngulungu	Golungo Alto	Kiengi	Quiengue
Kanzengu	Cazengo	Nguenji	Guenze
Ngola	Angola	Mbaka	Ambaca
Mbondo	Bondos	Lubolo	Libollo
Mbamba	Bambeiros	Kisama	Quissama
I-mbangala	Bangalas	Ba-sumbe	Sumbes
		Mbuiyi	Amboim

NAMES OF RIVERS.

Loji	Loje	Lukala	Lucalla
Ngezu	Nguezo	Kuiji	Cuiji
Ndanji	Dande	Kuangu	Quango
Mbengu }	{ Bengo	Luiyi	Lui
Nzenza }	{ Zenza	Kambu	Cambo
Kuanza	Quanza or Coanza	Ngangu	Gango

NAMES OF PRINCIPAL LOCALITIES.

Luanda	Loanda	Pungu a Ndongo	Pungo Andongo
Mbidiji	Ambriz	Kahuhi	Cahughi
Ndondo	Dondo	Malanji	Malange
Bulutu	Bom-Jesus, Bruto	Tala-mu-Ngongo	Talla Mugongo
Kalungembu	Calunguembo	Kasanji	Cassange
Ji-pambu	Pambos	Kapenda ka Mulemba	
Kasoki	Cassoque		Capenda Camulemba
Ndanji a Menia	Danje a Menha	Xa-Kalumbu	Chacalumbo
Niange a Pepe	Nhangue Apepe	Nduki*	Duque de Bragança
Kiongua	Quiongua		

ETYMOLOGY OF NAMES.

LUANDA. This has long been discussed by the newspapers of Loanda; but the only probable solution is that it signifies "lowland" and that it was given at first only to the site occupied by the present Lower City, which resembles the pit of an amphitheatre. To this day, every quarter of Loanda has its own native name; and in native parlance, "Let us go to Loanda" is synonymous with "Let us go down town." The Bay of Loanda is called *Kalunga Kofele*, that is "the Little Ocean," and the great ocean is *Kalunga Konene.*

MUTOLO. This is used for any wild forest region where fugitives find a shelter. The Mutolo, back of Loanda, has been the refuge of the last elephants. While they have been killed and scared off for a thousand miles to the east and a hundred miles to the north and south, a few specimens of this pachyderm have managed to prolong the struggle of life to this day at the very door of the Queen City of West Africa. In the slaving times the Mutolo was inhabited by runaway slaves with whom the Portuguese authorities had little wars. Even to-day the modern slaves of Loanda and the Quanza plantations (the contract servants and la-

*This is simply an adaptation of the Portuguese *Duque.*

borers) often try to hide themselves in those solitary woods.

MUXIMA. This is the name of the Kisama Chief who allowed the Portuguese to build a fort and a church on the left bank of the Kuanza River. In native parlance the place is still called *Bu Sexi.* The literal translation of *Muxima* is "liver;" but figuratively it is used just as we use "heart."

MASANGANU. Derived from *Ku-sanga*, to come across, to find, and from *Ku-sangana*, to find one another, to meet, it designates the meeting-place, confluence, of rivers; in this case of the Lukala and Kuanza.

NDONDO. This is the name of a shrub.

NDANJI signifies, according to a different intonation of the vowels, (1) a root, (2) a flat rock cropping up from the ground. In Ndanji a Menia (water-rock) the etymology fits in well. In the case of the river Ndanji has also the intonation of the equivalent for rock or slab, not of that for root.

JI-PAMBU is the plural of *pambu*, road, used for crossings or bifurcations.

NIANGE is the name of a white bird which follows the cattle.

PUNGU A NDONGO has, like Loanda, given rise to many discussions. It offers no difficulty for the trained linguist. *Pungu* is used (1) for a big fish, the size of a man; (2) in combination with *Nzambi* (God) as *Nzambi a Pungu* (the great God); (3) for the biggest of the stupendous rocks of Pungu a Ndongo. It evidently meant originally "superlative greatness." *Ndongo* is the name of the Kingdom of Angola. To this day the *Ngola* tribe is also called *Ndongo*, and one of the prov-

inces of the independent *Ngola* Kingdom bears the name of *Ndongo.* *Ndanji* and *Matamba* are the other provinces. Ndongo, Ndanji and Matamba were united, it seems, under the rule of Ngola Kiluanji kia Samba, the supreme chief. After the taking of Loanda by the Portuguese, Ngola, the King of Ndongo, moved his residence to the natural fortress of Pungu a Ndongo. Hence the meaning "The big rock of Ndongo." Driven again from his residence, the King of Ndongo moved to his present *mbanza* (capital) on the river Hamba.

NGOLA. This must originally have been the title of a chief of the A-mbundu (Ki-mbundu speaking) nation. The Kisama people, who have scarcely been modified by 400 years of contact with the whites, still say *ngol'etu* (our ngola) in addressing a chief. Its meaning is "lord" and it may be simply another pronunciation of *ngana*, the present equivalent for "free man, lord, mister, sir." The vowels *o-a* are often pronounced *a-a*, and *l* and *n* between vowels are frequently interchangeable. As the King is the representative of the nation, and all his subjects are his children, they are called by his name *akua-Ngola* (people of the Ngola) just as they say *akua-Kasanji* (people of Kasanji) when speaking of the I-mbangala, or as we might call the Egyptians Pharaonites from Pharaoh, their King.

NDALA. This word, of such frequent occurrence in proper names, was probably a variety of *ngana* and *ngola;* for *nda* and *nga* are interchangeable, and so are *na* and *la.*

JI-NDEMBU is the plural of *ndembu*, which is the title of a chief or king who has other chiefs under him as vassals. This title is used between the Mbengu and

Loji rivers. The principal *ndembu* chiefs are Mbamba-Mbuila, Nambua-Ngongo, Kingengu, Kazuangongo, Ngombe-a-Mukiama, Kibaxi. They form two confederations, and all hold more or less together to resist the encroachments of the whites.

MBANZA. All over the Ki-mbundu language field *mbanza* signifies the residence, or court, of a chief. Among the I-mbangala, and some of their neighbors, *mbanza* is, concurrently with *Kalunga*, the title of any chieftain. In the U-mbundu language field the court is *o-mbala* and the chieftain *se-kulu* (old father). The latter term is also current among the I-mbangala, and is often used in Kimbundu for "uncle." In the Ngola Kingdom a duke is called *mvunda* (in Portuguese spelling *vunda*); a count is *Di-kanda* (in Portuguese spelling Canda); a baron *Mbanza* or *Kalunga* (in Portuguese spelling Banza or Calunga). These titles should not encumber the maps.

SAMBA. This popular Bantu name deserves a special investigation of its history, as it is no doubt the etymon of our Sambo. Its meaning is not clear. In Ki-mbundu *Ku-samba* is "to greet a chief by clapping hands," and in Christian parlance "to worship, to pray."

NGONGO. This name recurs constantly in proper names, either alone or in combination. It has three distinct meanings: (1) the country round about one; (2) the misery of life; (3) a twin, named after his spirit. In *Tala-mu-ngongo* (look at the country) the meaning is clearly that of (1), for that is the natural cry of one standing on the edge of that precipitous depression, as his eye sweeps over the Kuangu valley.

In most other cases *ngongo* is probably the spirit *Ngongo*, which governs the birth and life of twins, and after which they are named.

MBONDO, a frequent name, is the Adansonia digitata, the monkey breadfruit tree.

MUTAMBA is a tamarind tree.

MULEMBA is a wild fig tree.

KISOLE is another kind of a sycamore.

MBANGU is the name of some high mountain in all districts of the Ki-mbundu language field. At Malanji the chief of the Mbamba tribe is called *Bangu* (not Mbangu), and most travellers have thought, erroneously, that the mountain got its name from the man.

NZAMBA is "elephant."

NZAMBI is "God."

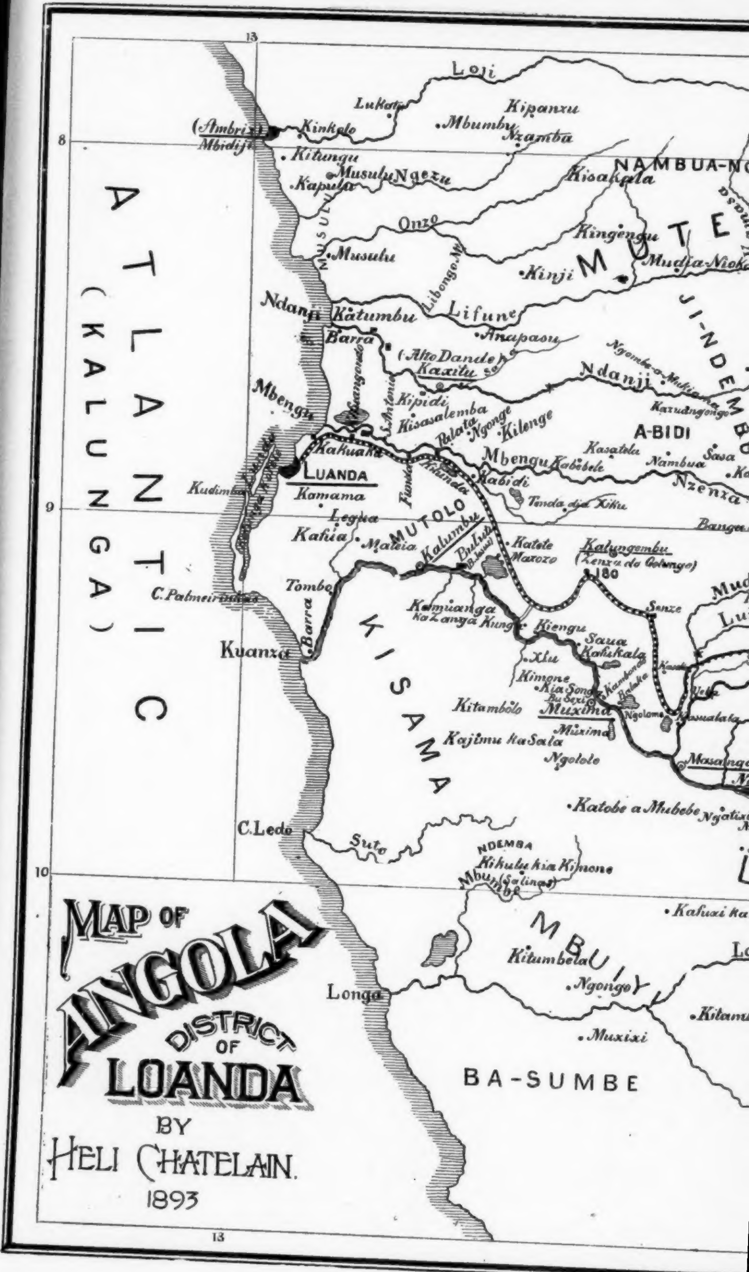
NZUMBI is the angry spirit of a deceased person, haunting the living in order to hurt them.

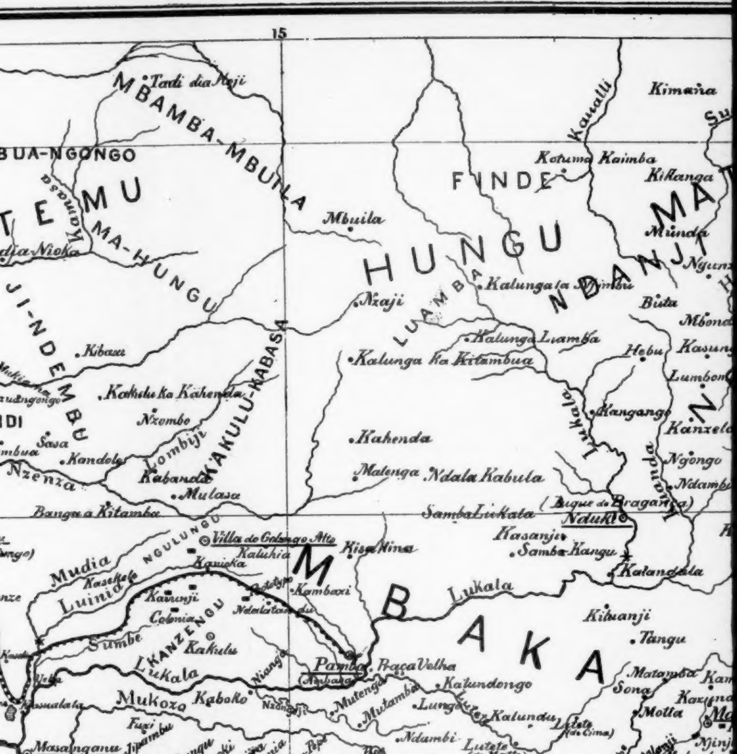
KILUNDU or *Kalundu* is the generic name of inferior spirits, usually termed gods.

MABUBA (*mupa* in the South) is the name of rapids or waterfalls.

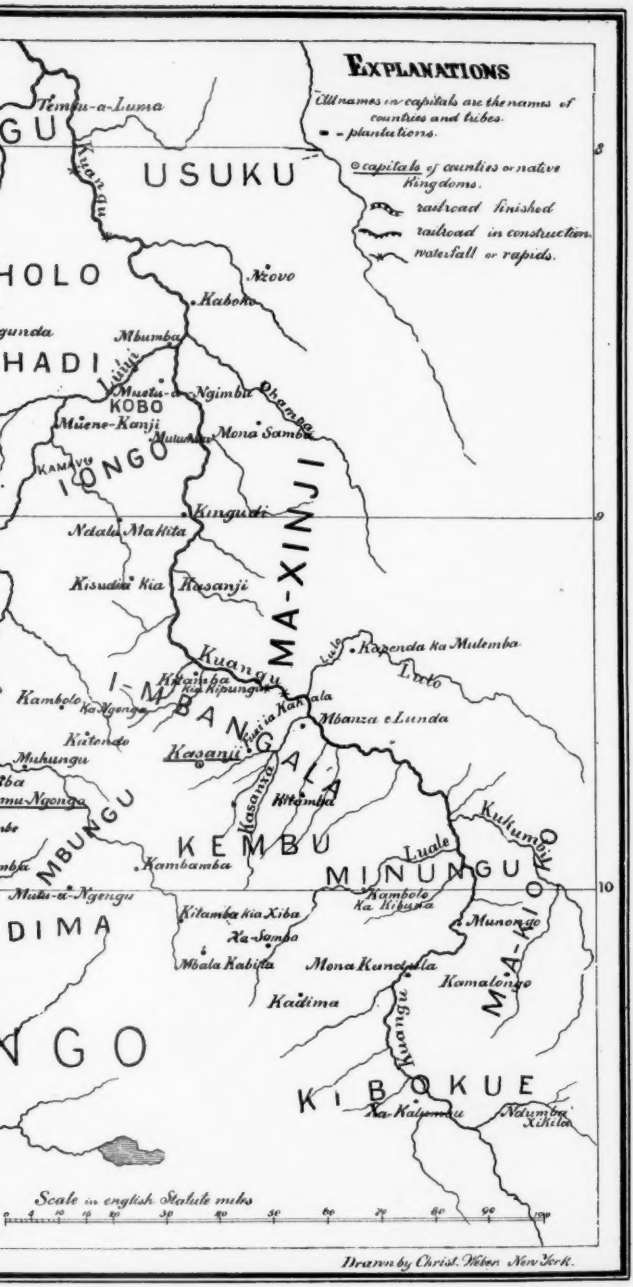
KALUNGA, before another name, is, in the left Kuangu basin, the title of a chieftain; therefore "Lord." Near the coast the word signifies only the ocean or the under world, the spirit world, death, eternity.

In the southern Kuanza basin and further south, many names of rivers have the prefix *Ku: e. g.*, Ku-anza, Ku-tatu, Ku-nene, Ku-bangu, Ku-ito, Ku-angu, Ku-iji. North of the Kuanza River many rivers have the prefix *Lu: e. g.*, Lu-kala, Lu-xilu, Lu-tete, Lu-iyi, Lu handa, Lu-eji, Lu-andu.


MAP OF
ANGOLA
DISTRICT
OF
LOANDA
BY
HELI CHATELAIN.
1893
ATLANTIC
(KALUNGA)
NAMBUA-N
MUTE
JI-NDEMBO
A-BIDI
MUTOLO
KISAMA
MBUIY
BA-SUMBE
NDEMBA
Loji
Lukoto
Kipanzu
Mbumbu
Nzamba
(Ambriz)
Mbidiji
Kinkelo
Kitungu
Musulu
Ngezu
Kapula
Kisakala
Onzo
Kingengu
Musulu
Kinji
Mudja-Nioka
Ndanji
Katumbu
Lifune
Anapasu
Barra
(Alto Dande)
Kaxilu
Ndanji
Mbengu
Kipidi
Kisasalemba
Palata
Ngonge
Kilenge
Kazudngongo
Kakuaku
LUANDA
Kamama
Mbengu
Kasatelu
Nambua
Sasa
Nzenza
Kudimba
Tenda dja Kiku
Legua
Kahia
Kalumbu
Katete
Mazozo
Kalungembu
(Zenza do Golungo)
180
Senze
Tombe
C. Palmeirinhas
Kuanza
Barra
Kamuanga
ka Zanga
Kiengu
Saua
Kahikala
Xilu
Kimone
Kia Songa
Kitambolo
Muxima
Muxima
Ngolome
Kajimu ka Sala
Ngolole
Katobe a Mubebe
C. Ledo
Suto
Kikulu kia Kimone
Mbu (Salinas)
Kafuxi ka
Kitumbela
Ngongo
Longa
Muxixi
13
8
9
10


15
Tadi dia Naji
MBAMBA-MBUILA
BUA-NGONGO
TEMU
MA-HUNGU
JI-NDEMBU
Kibaxi
Kakulu ka Kahenda
Nzombo
KAKULU-KABASA
Lombiji
Kabanda
Mulasa
Kandole
Sasa
Nzenza
Banga a Kitamba
Mbuila
FINDE
Kotuma
Kaimba
Kikanga
Kimana
Kawalli
HUNGU
Munda
NDANJI
LUAMBA
Nzaji
Kalunga ka Kitambua
Kalunga Luamba
Kalunga la Ngimbu
Bisita
Hebu
Kangango
Lukala
Kahenda
Malenga
Ndala Kabula
Samba Lukala
Kasanji
Samba Kangu
Nduki
Kalandala
Kanzele
Ngongo
Villa do Golungo Alto
Kaluhia
NGULUNGU
Mudia
Luinia
Kasikele
MBAKA
Kisa Nina
Kambaxi
Lukala
Kiluanji
Tangu
Kaiunji
Colonia
KANZENOU
Kakulu
Sumbe
Lukala
Njango
Pamba
Praça Velha
Kalundongo
Matamba
Sona
Motta
Mukozo
Kaboko
Mutenga
Mutamba
Lungo
Kalundu
Fuzi
Masanganu
Ndondo
Mbungu
Kasoki
Ndanjina
Menia
Ndumbi
Lutete
Kadima
Nguga
Pungu-a-Ndongo
Mulumbu
Kibinda
Pidi
Senge
Kiongua
Kitanza
Ngola
Mabuba
Sala
Ngatixi
LUBOLO
KIENIA
HAKU
Kaluzi ka Mbadi
Kixinji
Longa
Kisongo
Kitandu
MBULAN
Kitambolo kia Kangolo
Ngangu
Tamba
MUTAMBA
MA-LEME
TUNDA
Musende
KIBALA
KIENGI
Kutatu
NDU
NGUENJI
15 East of Greenwich


17
Kimaña
Susa
Kavualli
MATAMBA
HUNGU
Kaluxi ka
Ketuma
Kaimba
FINDE
Killanga
Nganga
Kambu
HUNGU
Múnda
NDANJI
Kiombo
Njunza
HOLO
Kalunga ka Njimbu
Hamba
Ngola Kiluanji kia Samba
LUAMBA
Bula
NGOLA
Ngola
Kingunda
Mbondo
Kalunga Luamba
Hebu
Kasungu
Kitambua
HADI
Lumbonbo
Kana
Kangango
Kizila
Lukala
Kanzela
Lukanda
Ndala Kabula
Ngongo
NGUDI
Ndambi
Mulolo
(Duque de Bragança)
Samba Lukala
Nduki
Katala ka Njinga
Kasanji
Kimbuaji
Kambu
Ndala Kisúa
Samba Kangu
MBONDO
Kalandula
Lukala
Kixinji kia Kambu
Kiluanji
Katala
Tangu
Kifukusa
AKA
Luangu
Matamba
Kamuxdi
Kalundongo
Sonq
Xiso
Ndala Samba
Kazendu
Kipakasa
Mutudi
Luimbi
Lungo
Kalundu
Motta
Malanji
Kambolo
Lutete (de Cima)
Katepa
Luiji
Ndambi
Njinji
Kisole
Lutete (de Matto)
Malanji
Mulumbu
Muhungu
Kadima
Ngiga
Lombe
Pidi
Kibinda
Kuiji
Njiu
Fila
Kuiji
Mbumba
Pungu-a-Ndongo
Sati
Sanza
Kaiongo
Tala-mu-Ngongo
Ngenda Kambalu
Kabingele
Mutulu
SONGO
Madimba a Ngombe
Kitaxi
Kajimbonbo
Kondo
Kiomba
MBU
Kalemba
HAKU
Kisonde
KIDIM
Kamanga
Jihoji
MBULAMA
Kindanji
Tamba
Kamasa
Masangu
MUTAMBA
MA-LEMBA
SONG
Musulumba
KIBALA
Luanda
Kutatu
KIENGI
Kuanza
NDULU
Scale
17


EXPLANATIONS
All names in capitals are the names of countries and tribes.
- - plantations.
⊙ capitals of counties or native Kingdoms.
railroad finished
railroad in construction.
waterfall or rapids.
Tembu-a-Luma
USUKU
Kuango
HOLO
Nzovo
Kaboko
Mbumba
HADI
Luiri
Mutu-a-Ngimbu
Obamba
KOBO
Muene-Kanji
Mona Samba
IONGO
Kamviu
Kinguri
Ndala Makita
Kisuda Kia Kasanji
MA-XINJI
Kuangu
Kapenda Ka Mulemba
Luto
Kambole Ka Ngenge
Kitenda
Kasanji
Mbanza a Lunda
Muhungu
Kasanji
Kitamba
Kulumbidi
MBUNGU
KEMBU
Luale
Kambamba
MINUNGU
Mutu-a-Ngengu
Kambole Ka Kibuna
DIMA
Kitamba kia Xiba
Munongo
Xa-Samba
Mbala Kabita
Mona Kanzala
Kamalonge
Kaitima
MA-LOJO
Kuango
NGO
KIBOKUE
Xa-Kalombu
Ndumba Xikila
Scale in english Statute miles
0 5 10 15 20 30 40 50 60 70 80 90 100
8
9
10
Drawn by Christ. Weber New York.

LETTER FROM MR. CARL LUMHOLTZ, IN NORTHERN MEXICO.

The following letter was received June 13 :

MORELOS, May 21, 1893.

I hope you received a letter sent in January from Guadalupe y Calvo.*

Since then I have been nearly the whole time among the Tepehuanes, a very intelligent but extremely reserved tribe of Indians. I have made a regular harvest of ethnological material from them, and have succeeded in gaining entrance to their secret rites, an allowance which they absolutely refuse (to) Mexicans. They used to be very warlike, probably more so than any other tribe of Mexico. The missionaries found it a hard task to convert them.

At present the greater part of them, who are living in Durango, are getting to be Mexicanized, but of the probably 1500 individuals who live inside of Chihuahua, I was pleasantly surprised to find many in a very primitive state of culture, living in remote *arroyos* (stream-beds) without knowledge of Spanish. They still have an interesting ceremony of making their god and the personified four elements appear at nightly *séances*, for the purpose of which they erect special log houses, that can be made entirely dark inside, having no windows, and but one small entrance.

In "la Semana Santa" (Holy Week) I was fortunate enough to see the big annual foot-race of the Tepehuanes at Baborigame.

* Printed in BULLETIN for March, 1893, pp. 64-65.

Two hundred and twenty-four took part in it, and the race was especially instructive, because the racers were divided into different groups; men, women, married, unmarried, adults, children. However, the sport is not now quite up to the mark of former days, for several reasons, coherent with their "Mexicanized" evolution. The best group of runners was that of the married men, the best of whom, in 3 hours, 1½ minutes, made 13 *vueltas* (circuits). I measured a "vuelta" and found it to be 9223 feet (9223 x 13=119,899 feet=22 miles, 3739 feet).

There was no sign of fatigue shown by the two men who came in first; and as an interesting comparison, I may add that some young Mexicans, who also got up a race at the same time, made, the best of them, one "vuelta" in twelve minutes, while all arrived breathless and apparently not having been able to continue much more. But the Tarahumares are far better runners than the Tepehuanes, and have brought the fast racing into a wonderful state of perfection. I merely mention the above facts to show what endurance an Indian can evince, even in the half-starved condition in which the greater part find themselves at present. I was credibly informed by two independent parties, that only 8 years ago in Baborigame, the best man of the "married group" made no less than 27 "vueltas," on this same race course (249,021 feet=47 miles, 861 feet). This runner is recently dead, and was well-known over the Sierra. His antagonist made 26 (vueltas), but fell down exhausted, while the former danced lively next day. The race lasted from midday to about 8 P.M.

I have now gone over the western part of the Sierra

from west of Nabogame to here. It is two or three thousand feet lower than the high Sierra, and surrounded with innumerable *barrancas* (ravines) and *arroyos* which make the landscape, seen from a high point, look like stiffened waves. Although as hot down in the *barrancas* and *arroyos* as in *tierra caliente* (hot land), the real *tierra caliente*, or *la costa* (coast) is not reached in less than four days' travel. Where the *arroyos* lie as high as 5000 feet above the sea-level, as in the one where the little mining-place San José is situated, the climate is remarkably even and probably of the healthiest in the world. Lower down the heat is greater than is consistent with comfort. Here in Morelos we have at present, every day, 100° Fahr. in the shade; but the nights are deliciously cool. Even here, at about 1500 feet above sea-level, snow-falls are not unknown, although rare. On the 11th of January, 1884, the manager of the mine tells me, 8 inches of snow fell in Morelos.

At present, as is well known, we are here in Northern Mexico going through an exceedingly dry time. In two years the crops have dried away in many parts of the Sierra. This year, still no rain. A traveller in such a country suffers considerably, and his animals much more. The water dries up in places where it has never been known to be missing. My mules have had to travel twenty-four hours, in a scorching sun, without water. Still, in these hot *barrancas*, I see no difference in the vegetation. The trees and plants don't seem to be affected by rain or no rain. The only exception I have noticed is, that the flat leaf-like joints of the stem of the Opuntias are commencing to shrivel up just a

little on the surface; but the fleshy inside, which is eaten by the Indians, is apparently as juicy as ever.

And what an astonishing adaptation to natural conditions is not the *Cereus Pithaya*, this 20 to 35 feet high cactus, with candelabra-like branches, growing on the very driest and most barren ground, but yielding just now in these days, a most juicy, refreshing fruit in great numbers! The Indians on the western slopes of the Sierra Madre subsist at present almost entirely on this Pithaya fruit, and the same may at times be said of myself, as I find them wholesome and nourishing.

I am in these days in the old precincts of the Tubares, who are supposed to be extinct. I find that there are a few left yet, and I have photographed and measured two pure-bred ones here. Only four women and one man are yet able to talk the language at this place. I may hope to meet with some more farther down the river, but there are probably not twenty families left of the whole tribe, and most of them unable to speak the language; and only just a few pure-bred. They seem to be well made and of a nice, jolly disposition. I am taking down the language, which I think will prove of considerable interest, as there is very little known about this race. They are said to have spoken two entirely different languages; one a dialect of Nahuatl.

I shall now follow the river San Miguel down to San Ignacio, and from there, over Batopilas, retire again to the high Sierra, this time investigating the grand complex of cave dwellings of the *gentiles* (pagans) around Santa Ana. . . .

With kindest regards,

CARL LUMHOLTZ.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

AN INTERNATIONAL GEOGRAPHICAL CONFERENCE.—The *Comptes Rendus* of the Paris Société de Géographie, No. 11, p. 246, has the following announcement:*

"The *National Geographic Society* of Washington sends notice of the International Conference on Geographical Sciences, organized by itself, in concert with the *American Geographical Society* of New York, on occasion of the Chicago Exposition. This Conference will take place in the Columbus Hall of the Institute of Arts, at Chicago, on the 27th of July next. The members of the Geographical Society (of Paris) who are in Chicago at that time are invited to be present (at the Conference)."

So far as the American Geographical Society is concerned, the announcement in the *Comptes Rendus* is absolutely incorrect. This Society is in no way responsible for the International Conference on Geographical Sciences to be held at Chicago.

*La *National Geographic Society* de Washington fait part de la Conférence internationale pour les sciences géographiques qu'elle a, de concert avec l'*American Geographical Society* de New York, organisée à l'occasion de l'Exposition de Chicago. Cette Conférence aura lieu dans le Columbus Hall de l'Institut des Arts, à Chicago, le 27 juillet prochain. Les membres de la Société de Géographie (de Paris) qui se trouveront à Chicago à cette époque sont invités à y assister.

The Council of the Society positively declined to take part in the proposed Conference, for the sufficient reason that the Congress assembled at Berne in the year 1891 had decided that the next International Congress on Geographical Sciences should meet in London, at a time to be determined by the Royal Geographical Society; and the Council felt bound to respect this decision.

TOSCANELLI.—Under this title Mr. G. Uzielli brought out at Florence in January last the first number of a publication intended to illustrate the geographical, historical, artistic and literary relations of Italy and America, and to strengthen the ties between the New Continent and "*the country to which it owes its discovery.*"

Especial attention will be paid to the documents relating to the age of discovery and the ancient history of America, to be found in the Italian archives and libraries.

Toscanelli is written in French, and the numbers will appear at irregular intervals.

In his brief address to the reader Mr. Uzielli divides the glory of the discovery between Paolo dal Pozzo Toscanelli and Christopher Columbus. "It would be as difficult," he says, "to give the first place to the one or to the other of these two great men, as to establish a parallel between the head and the arm, between Louvois and Turenne, between Pitt and Wellington, between Bismarck and Moltke."

This is a matter of appreciation. Bismarck will do very well for a head, but the reader must be amazed

when he is asked to regard Turenne and Wellington as no more than the arms of Louvois and Pitt; to say nothing of the chronology.

Mr. Uzielli seems to have looked too long and too lovingly at one figure,* and to have lost the sense of proportion. Toscanelli was undoubtedly a great man, but it may be affirmed, with or without the evidence of the twenty years' researches, that he does not divide with Columbus the glory of the discovery.

Mr. Uzielli speaks of impartiality,† but the tone of his address to the reader is exclusively Italian. According to him the discovery of America was the work of Italy, and of Italy alone; for he does not mention the name of Spain. It is easy to believe that even the measure of renown accorded to Columbus is given, not to the man, but to the Italian; so far does patriotism appear to prevail over Mr. Uzielli's respect for the truth of history.

The articles in this first number of the new magazine are full of interest.

Several relate to Toscanelli; others to Columbus and to Vespucci.

Among these last are notices of some of Vespucci's manuscripts, hitherto unknown or overlooked. One of these is a volume of exercises in Italian and Latin, composed, as Mr. Uzielli thinks, between the years 1480 and 1490. Three pages of this MS. are given in facsimile.

* He says, in foot note No. 3 on p. 3, that he has devoted twenty years to his researches on Toscanelli.

† Notre but étant surtout de recueillir des faits, et non de faire des appréciations, nous accueillerons de préférence dans le "TOSCANELLI" les articles ayant des pièces à l' appui et les critiques faites avec une méthode impartiale et positive. —*Toscanelli*, p. 2.

It was Mr. Uzielli himself who discovered the origin of the other MSS. These are the letters of Guidantonio Vespucci, Florentine ambassador to France, written in 1478–1480, when Amerigo was attached to the embassy. Mr. Uzielli, struck with the resemblance between the handwriting of these despatches and that of Vespucci's book of exercises, called in the best palæographers, and is supported by them in his conclusion that the letters were written, and probably composed, by Amerigo; though the handwriting does not always imply the composition of a paper.

In another article Mr. Uzielli defends, with his well-known learning and ingenuity, the authenticity of Piero Vaglienti's manuscript relation of the voyages of Vespucci.

A document, to which some importance is attached, is Verino's Latin poem, supposed to have been written in 1482 in honor of Toscanelli, who died early in that year. The poet declares that Toscanelli ought to have lived forever, that such a philosopher rarely appeared upon earth, that he was Pythagoras and Hippocrates and Ptolemy, that he was an angel for purity of life, and that his fame will increase to the end of time. Rhapsodies like this are common enough in literature, but Mr. Uzielli takes Verino seriously, and adds a commentary with notes, one of which is a curiosity:

"In order to avoid other explanations, I apprise the reader that I profess a kind of agnosticism which differs little from that of Darwin." *

This bit of autobiography may be useful to some future Verino.

---

* Pour éviter d' autres explications, je préviens le lecteur que je professe un genre d' agnosticisme qui diffère peu de celui de Darwin.— *Toscanelli, p.* 17, *note* 2.

Attention is called, on page 40, to the lack of special works and collections of books in the public libraries of Florence. Among the deficiences are the atlases of Jomard, Santarem, Kunstmann, Fischer and Kretschmer, the collections of the Hakluyt Society, the Schéfer-Cordier *Recueil*, Navarrete, Las Casas, many of Harrisse's writings, Yule's Marco Polo, and others.

On the same page Mr. Uzielli prints the following exact list of the Parts and Volumes, which make up the great Italian collection of documents relating to Columbus, now in course of publication, with the names of the scholars charged with the preparation of the work:

First Part (3 volumes).

CESARE DE LOLLIS, *A Complete Collection in chronological order of the known writings of Christopher Columbus.*

Two volumes of text, and one volume containing the heliotype reproduction of the writings of Christopher Columbus with the transcription on the opposite page.

Second Part (3 volumes).

LUIGI TOMMASO BELGRANO and MARCELLO STAGLIENO, *Private Documents of Christopher Columbus and his family* (1 vol.).

Official Documents, relating to Christopher Columbus, published from the MS. in the Archives of the Ministry for Foreign Affairs at Paris, with variants from those in the Genoese Archives (1 vol.).

CORNELIO DE' SIMONI, *Columbian Questions*—ALBERTO SALVAGNINI, *Christopher Columbus and the Co-*

lombo Corsairs in the XV. Century—ACHILLE NERI, *The Portraits of Christopher Columbus* — UMBERTO ROSSI, *The Medals of Christopher Columbus* (1 vol.).

Third Part (2 volumes).

GUGLIELMO BERCHET, *Italian Sources for the Discovery of the New World—Preface and Official Documents* (1 vol.)—*Contemporary Narratives* (1 vol.).

Fourth Part (2 volumes).

ENRICO ALBERTO DE ALBERTIS, *The Art of Navigation in the time of Christopher Columbus* (1 vol.). P. TIMOTEO BERTELLI, *Magnetic Declination and its Variation in the Space discovered by Christopher Columbus.* VINCENZO BELLIO, *Ancient Geographical Charts relating to America which are found in Italy:* with heliotype reproduction of the most important among them.

Fifth Part (3 volumes).

GIOVANNI CELORIA and GUSTAVO UZIELLI, *Paolo dal Pozzo Toscanelli, Florentine astronomer and geographer of the XV. Century* (*1397–1482*), 1 vol. with maps—GIUSEPPE PENNESI, *Peter Martyr of Anghiera.* PROSPERO PERAGALLO, *Leone Pancaldo.* LUIGI HUGUES, *Amerigo Vespucci, Giovanni da Verrazzano* and *Battista Genovese.* VINCENZO BELLEMO, *John Cabot*—ANDREA DA MOSTO, *Antonio Pigafetta, with the reproduction of the MS. in the Ambrosian Library at Milan with its drawings*—MARIO ALLEGRI, *Girolamo Benzone* (2 vols.).

Sixth Part (1 volume.)

GIUSEPPE FUMAGALLA, with the assistance of PIETRO AMAT DI SAN FILIPPO, *Italian Bibliography of printed works relating to Christopher Columbus and the Discovery of America.*

THE HODGKINS FUND.—The Smithsonian Institution has issued the following circular concerning the Hodgkins Fund Prizes:

In October, 1891, Mr. Thomas George Hodgkins, of Setauket, New York, made a donation to the Smithsonian Institution, the income from a part of which was to be devoted "to the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man." The Smithsonian Institution now announces the following prizes to be awarded if satisfactory papers be offered in competition:—1. A prize of $10,000 for a treatise embodying some new and important discovery in regard to the nature or properties of atmospheric air. These properties may be considered in their bearing upon any or all of the sciences—*e.g.*, not only in regard to meteorology, but in connection with hygiene, or with any department whatever of biological or physical knowledge. 2. A prize of $2000 for the most satisfactory essay upon—(*a*) The known properties of atmospheric air considered in their relationships to research in every department of natural science, and the importance of a study of the atmosphere considered in view of these relationships. (*b*) The proper direction of future research in connection with the imperfections of our knowledge of atmospheric air, and of the connections of that knowledge with other sciences. The essay, as a whole, should tend to indicate the path best calculated to lead to worthy results in connection with the future administration of the Hodgkins foundation. 3. A prize of $1000 for the best popular treatise upon atmospheric air, its properties and relationships (including those to hygiene, physical and mental). This essay need not exceed 20,000 words in length; it should be written in simple language and be suitable for publication for popular instruction. 4. A medal will be established, under the name of the Hodgkins Medal of the Smithsonian Institution, which will be awarded annually or biennially, for important contributions to our knowledge of the nature and properties of atmospheric air, or for practical applications of our existing knowledge of them to the welfare of mankind. This medal will be of gold, and will be accompanied by a duplicate impression in silver or bronze. The treatises may be written in English, French, German, or Italian, and should be sent to the secretary of the Smithsonian Institution, Washington, before July 1, 1894, except those in competition for the first prize, the sending of which may be delayed until December 31, 1894.

The papers will be examined, and prizes awarded, by a committee to be ap-

pointed as follows: one member by the Secretary of the Smithsonian Institution, one member by the president of the National Academy of Sciences, one by the president, *pro tempore*, of the American Association for the Advancement of Science; and the committee will act together with the secretary of the Smithsonian Institution as member, *ex-officio*.

The right is reserved to award no prize if, in the judgment of the committee, no contribution is offered of sufficient merit to warrant an award.

An advisory committee of not more than three European men of science may be added at the discretion of the Committee of Award.

If no disposition be made of the first prize at the time now announced, the Institution may continue it until a later date, should it be made evident that important investigations relative to its object are in progress, the results of which it is intended to offer in competition for the prize. The Smithsonian Institution reserves the right to limit or modify the conditions for this prize after December 1, 1894, should it be found necessary. Should any of the minor prizes not be awarded to papers sent in before July 1, 1894, the said prizes will be withdrawn from competition.

A principal motive for offering these prizes is to call attention to the Hodgkins Fund, and the purposes for which it exists, and accordingly this circular is sent to the principal universities, and to all learned societies known to the Institution, as well as to representative men of science in every nation. Suggestions and recommendations in regard to the most effective application of this fund are invited.

It is probable that special grants of money may be made to specialists engaged in original investigation upon atmospheric air and its properties. Applications for grants of this nature should have the endorsement of some recognized academy of sciences or other institutions of learning, and should be accompanied by evidences of the capacity of the applicant in the form of at least one memoir already published by him, based upon original investigation.

To prevent misapprehension of the founder's wishes, it is repeated that the discoveries or applications, proper to be brought to the consideration of the Committee of Award, may be in the field of any science or any art, without restriction; provided only that they have to do with "the nature and properties of atmospheric air in connection with the welfare of man."

Information of any kind desired by persons intending to become competitors will be furnished on application.

All communications in regard to the Hodgkins Fund, the Hodgkins Prizes, the Hodgkins Medals, and the Hodgkins Fund Publications, or applications for grants of money, should be addressed to S. P. Langley, Secretary of the Smithsonian Institution, Washington, U. S. A.

WASHINGTON March 31, 1893.

THE MOVEMENTS OF OUR POPULATION.—In a paper contributed to the *National Geographic Magazine*, Vol. V., pp. 21–44, and illustrated with plates and

tables, Mr. Henry Gannett analyzes the Census returns of the United States from 1790 to 1890, and presents many interesting facts. The first table shows the population at each successive decade, with the rate of increase.

In 1790 the people numbered 3,929,214; in 1890 they were 62,622,250. The highest rate of increase was for the ten years ending with 1810, 36.38 per cent.; the lowest for the period 1860–1870, 22.66 per cent. For the decade ending with 1880 the increase was 30.07 per cent., but it fell in the next ten years to 24.85 per cent.

In 1790 the area of the country was 827,844 square miles, and the density of population was 4.75 to the square mile. In 1890 the area had increased to 3,603,884 square miles, and the density to 17 37. In southern New England the density is as great as in some of the European countries, Rhode Island having 318 to the square mile, and Massachusetts 278.

The Census classes as "Urban Population" the inhabitants of all cities of 8,000, or more. A century ago these cities were six in number, and the urban population was one thirty-third of the entire population. To-day the cities of 8,000 inhabitants, or more, number 443, and they contain 29 per cent. of the population. The increase in the cities has been greater during the past decade than at any previous time.

The average size of families has diminished continuously from 5.55 in 1850 to 4.93 in 1890. The largest families are in the South, the smallest in New England and the frontier states.

As regards race, the population is composed of about

55,000,000 whites, 7,500,000 Africans and mixed bloods, 150,000 Chinese and Japanese, and a few hundred thousand Indians. In 1790 the colored race formed one-fifth of the population; in 1890 the proportion had fallen to less than one-eighth. The rate of increase of this race has apparently surpassed that of the whites in the two decades, 1800–1810 and 1870–1880; in every other it was inferior, and in 1890 the percentages were: White, 26.68; Colored, 13.11.

The immigration from Europe began to be of importance in the decade 1830–1840, when it amounted to 599,125; for the next ten years it was 1,713,251; then, for the next four decades, successively, 2,598,214, 2,314,824, 2,812,191, and 5,246,613. These totals include the arrivals from Canada.

Of the entire number, 4,504,128 are Germans, 5,911,454 natives of the United Kingdom (3,481,074 Irish), and 1,067,548 Scandinavians. Other nationalities are represented by smaller numbers.

In 1890 the native white population numbered 45,863,008; the foreign born 9,248,547. All the foreign born are in the States north of Mason and Dixon's line and in the Western States and Territories; the Southern States having received practically no European immigration. Adding to those of foreign birth the number of those born of foreign parents, Mr. Gannett estimates the foreign element of the white population at 25,000,000.

This element constitutes 45 per cent. of the inhabitants in the Northern States east of the plains. In Massachusetts and New York it amounts to 56 per cent., in Connecticut to 50, and in Rhode Island to 58 per

cent., while in Wisconsin and Minnesota those of foreign blood amount to three-fourths, and in North Dakota to four-fifths of the population.

In the large cities the foreigners preponderate. In Boston they constitute 70 per cent, in Brooklyn 72, in New York 82, in Buffalo 78, in Chicago 80, in Detroit 79 and in Milwaukee 87 per cent.

The whites of native extraction are estimated at 30,000,000, those of foreign extraction at 25,000,000, and the colored at 7,500,000.

Mr. Gannett does not seem to regard these figures with satisfaction; but he comforts himself with the reflection that 10,500,000 of the foreign whites, being of British and Irish origin, may be added to the natives to secure for some time the predominance of the British blood.

The Geographical Club of Philadelphia.—The *Bulletin* of this Club, Vol. 1, No. 1, dated January, 1893, is devoted to a handsomely illustrated paper on Mountain Exploration by Edwin Swift Balch.

Mr. Balch has done a great deal of mountaineering and has read much on the subject, and, like an enthusiast, he magnifies his office. Mountaineering, he says, belongs rather to the field of geographical exploration, and climbing proper is only a branch of it. If, as Boileau affirms, it requires time and taste to write a poem, it is a matter of time and practice to make a good mountaineer. The best way is, according to Mr. Balch, to do a great many small climbs at first without a guide, so as to acquire proficiency, and occasionally to take a climb with a good guide in order to study his methods.

An important rule, too often forgotten, is to learn to walk very slowly and very steadily.

Mr. Balch's essay is entertaining and instructive, but it would have been improved by revision. There is a bad slip on p. 11:

"All the Caucasus Mountains, a range almost as large as Switzerland," etc.

The range of the Caucasus covers an area nearly four times the size of Switzerland.

Much worse than an error in superficial measurement is the following remark, on p. 5:

"To the great mountain of Nepal he affixes the name of a little Indian surveyor, 'Everest,'" etc.

The reader of this feels some curiosity to know what manner of man he may be, who looks down on Sir George Everest as a little surveyor.

DOMESTIC REINDEER IN ALASKA.—Dr. Sheldon Jackson's report to Commissioner Harris, of the Bureau of Education, on the introduction of domestic reindeer into Alaska, has been issued by the Government as Senate Mis. Doc. No. 22, 52d Congress, 2d Session.

Sixteen reindeer were purchased in Siberia in 1891, and left on Amakuak and Unalaska Islands where they were found in good condition the next year, with an addition of two to their number. In 1892, five trips were made to Siberia and 175 reindeer were successfully landed at Port Clarence, the nearest good harbor on the American side. Reconnoissances previously made had proved that there was abundance of moss for pasturage in the neighborhood of the station at this place, where a house was built for the superintendent and his assistant. Four Siberians, acquainted with

the management of the reindeer, were placed in charge of the herd, and a number of Alaskan Eskimo were apprenticed to them The expectation is that each Eskimo, as he learns the business, may be started in life with a small herd of his own, and that in this way the country may gradually be peopled with a hardy race, now threatened with extinction.

According to Dr. Jackson, these Eskimo are superior to those of Greenland and Labrador. He says that on the great rivers emptying into the Arctic they are a large race, and that at Kotzebue Sound he has met men and women six feet in height. The physical strength of the women is prodigious. We are told of one who walked off with a box of lead weighing 280 pounds; and of another who lifted into her birch-bark canoe a stone that weighed 800 pounds. If the birch-bark canoe had been less fragile, the stone might have weighed 1600 pounds, for the air of the North expands the mind as well as the muscles.

Dr. Jackson informs us that

> Arctic and subarctic Alaska cover an empire in extent equal to nearly all Europe.

The best authorities estimate the area of Alaska at 600,000 square miles, and that of Europe at nearly 3,800,000.

Dr. Jackson, who is General Agent of Education in Alaska, does not know the size of Europe, but he must know that the great outlying territory, in which he works, covers about one-sixth of the surface of the United States. Does he really believe that the area of the United States is twice as great as that of all North America?

COSTA-RICA AT THE MADRID EXHIBITION, 1892.*—The Historical-American Exhibition at Madrid, in the autumn of 1892, was remarkable for the wealth of its collections illustrating in every way the life of the American races before the Conquest.

This *catalogue raisonné*, prepared by Messrs. Peralta and Alfaro, describes a great number of objects in gold, stone and pottery, native arms and utensils, specimens of birds, fossils, etc., from the National Museum of Costa-Rica and the cabinets of private collectors.

In the Introduction, which has also been issued as a separate publication,† Mr. Peralta sketches the physical features of Costa Rica, and the condition of the natives, passing rapidly towards extinction in spite of the efforts made to improve their lot. The Guatusos, who inhabit the neighborhood of Lake Nicaragua and the river San Juan, make a miserable living by hunting and fishing, and raise Indian corn and plantains in a small way. The Talamancas, the Térrabas and the Borucas occupy the Atlantic and Pacific slopes of the mountains on the Colombian frontier. Besides these natives who number altogether less than twenty thousand, there are in the interior settlements a few scanty remnants of the pre-Columbian races, almost without tradition of their forefathers, and almost totally ignorant of their arts and industries.

---

* Etnologia Centro-Americana—Catálogo Razonado de los Objetos Arqueológicos de la República de Costa-Rica en la Exposición Histórico-Americana de Madrid—1892. por D. Manuel M. de Peralta y D. Anastasio Alfaro.
8° Madrid, 1893.

† Etnología Centro-Americana—Apuntes para un libro sobre los Aborígenes de Costa Rica por Manuel M. de Peralta. 8vo. Madrid, 1893.

At the time of the Conquest the principal tribes that occupied the territory of Costa Rica were the Náhuas (Aztecs) and Mangues (Chorotegas), Güetares, Viceitas, Térrabas, Changuenes, Guaymíes, Quepos, Cotos, and Borucas. The Náhuas, at least, came from the north; the Mangues had their settlements on the shores of the lakes Nicaragua and Managua, and extended to the southern parts of Mexico, where their language was still spoken at Acalá a few years ago. Mr. Peralta does not attempt to determine the ethnic affinities of the Güetares, though it seems certain that they underwent the Mexican influence.

That they were not entirely savage, is sufficiently established by their work in gold ornaments, and artistically worked stones discovered at Aguacaliente and Turrialba, and they were honorably distinguished from their neighbors in the north, and from the Chorotegas, by the fact that they did not practise cannibalism.

There are marked affinities between the Guaymíes, Térrabas, Changuenes, and Borucas, and the most eastern tribes of the Isthmus.

These peoples of Costa Rica, now so feebly represented, are believed to have numbered a hundred thousand souls in the year 1564.

The Náhuas and Mangues in the Nicoya district have completely disappeared.

Mr. Peralta's thorough knowledge of his subject enables him to correct errors in ethnography and geography, made by Latham and Pimentel.

THE ROYAL GEOGRAPHICAL SOCIETY'S AWARDS.—At the Annual Meeting of the Royal Geographical

Society, held on the 29th of May, the Founder's Gold Medal was presented to Frederick Courtney Selous, for his explorations in British South Africa; and the Patron's Gold Medal to W. Woodville Rockhill, for his travels and explorations in Western China, the Koko Nor region and Tibet.

Mr. R. W. Senior received the Murchison Grant, in recognition of his laborious surveys continued for several years in the Punjab Himalayas; Mr. Henry O. Forbes, the Gill Memorial for his work of exploration in New Guinea, the Malay Archipelago and the Chatham Islands; and to Mr. Charles Hose was awarded the Cuthbert Peek Grant, for observations and explorations in Saráwak, Borneo.

ADMISSION OF LADIES TO THE ROYAL GEOGRAPHICAL SOCIETY.—The Annual Meeting of the Royal Geographical Society, held May 29, and fully reported in the London *Times*, was of unusual interest.

The report of the Council was taken as read, and its adoption was moved, when a Fellow arose to ask the meaning of the following passage:

"Membership.—The question of electing ladies as ordinary fellows was considered by a special general meeting on April 24, when it was decided in the negative by a considerable majority. The council regard this vote (unless hereafter rescinded by a general meeting) as conclusive against any further election of ladies as ordinary fellows, without prejudice to the *status* of those already elected."

He moved that the words from *without* to *elected* be omitted. The President ruled against the power to make this motion, and the Fellow then moved the rejection of the report. The motion was put and lost, and the report was adopted by a vote of 237 ayes to 144 noes.

After the presentation of medals and prizes, and the delivery of the President's Annual Address,

The Earl of Mayo desired to move that the vote of April 24 be rescinded, or, to put it in another form, that the council should continue to elect ladies as they had done before. They had already elected 22, and in the president's own words they wanted them and a great many more. He hoped the resolution would be passed on the ground that a great many other learned societies in England and Scotland had ladies for their members, and he did not see why the Royal Geographical Society should not follow their example. He moved:—"That the council be requested to elect more ladies as Fellows." The question as to the limit in the number to be so elected was a matter of detail.

It was moved after discussion, that the question be postponed; when

The Earl of Northbrook said that, having lately had the honor of being president of the Royal Asiatic Society, which considered itself far more important than the Royal Geographical Society, dealing as it did with the ancient languages of the world and requiring great knowledge and skill on the part of its members, he desired to say that the Royal Asiatic Society willingly and readily, and with great satisfaction elected ladies. Not only so, but the society was served by a very learned and able lady as assistant secretary. When he had the honor of being the president of the Royal Asiatic Society, ladies read most able papers before it, and he most heartily supported the proposal that ladies should be elected as Fellows of the Royal Geographical Society.

He was followed by

Sir John Lubbock who, as president of the Anthropological Society, said that the presence of ladies had not in any way detracted from the usefulness of his society.

General Strachey spoke to the same effect. He considered it most desirable that ladies should be admitted as members of the society, and in asking them to postpone their decision on the subject he did so to show that it was not desired in any way to act tyrannically or unfairly. So far as they had any means of judging, the general feeling of the Fellows was in favor of the action of the council in permitting the election of ladies.

Sir William Flower agreed with the two last speakers in asking Lord Mayo to postpone his motion. He remembered the time, 40 years ago, when ladies were not admitted to their meetings, and a distinguished Swedish lady traveler was refused admission on presenting herself at the doors. Now they freely admitted ladies to their meetings, and it was but a small step further to allow them to pay their subscriptions.

After some further discussion Lord Mayo consented to bring the matter before the society again at a meeting to be summoned in accordance with the regulations of the society.

The *Times* has printed some entertaining letters on the subject. The Hon. G. N. Curzon, M.P., who is a member of the Council, writes from the House of Commons to express his belief that the four good letters, F.R.G.S., will sink to a lower market value "if they are paraded by vagrant womanhood on visiting cards and in books."

One Fellow, evidently young and dangerously beautiful, declares that his family will not allow him to attend meetings open to women in their own right.

It appears, however, from a letter written by Admiral McClintock, that the objection is to the manner, rather than to the matter, of the action taken by the Council. After reciting the history of the innovation, the Admiral concludes:

> Among the dissentient Fellows there are some who were ready to vote definitively against the admission of ladies, there were others ready to admit them with restriction as to sitting on the council, there were others who would receive them as Associate Fellows; but the one point upon which we were unanimous was the legal point of the action of the council having been *ultra vires*, and the absolute necessity of having the whole question submitted to a general meeting, so that what the Fellows generally wished might be done entirely and unquestionably under the provisions of the charter.
>
> Had the dissentient Fellows been permitted at the special general meeting to state their views and their positions, which was not at all, as has been ignorantly assumed, against the election of ladies, provided that such elections were carried through under the provisions of the charter, all the heat, all the attribution of bad motives, all dispute would have been avoided, of the injurious effect of which upon any society no one can be more sensible than are the dissentient Fellows, whose only object has been that, in so important a question as a change in the constitution of the society, whatever is done should be done legally and in accord with the wishes of the entire body.

Some misapprehensions with regard to matters of fact are corrected by Mr. Douglas W. Freshfield, a member of the Council for fifteen years and for twelve years one of the honorary secretaries of the Royal

Geographical Society, in a letter to the *Times* of June 3. He says that the principle of the admission of ladies to the Society was not accepted in consequence of any recent incident. It was affirmed unanimously by the Council as long ago as 1887, and recognized again in 1890. Mr. Freshfield disposes of a good many so-called arguments against the admission of ladies by quoting the charter of the Society, according to which every "loving subject" of the Queen who desires to assist in promoting and promulgating geographical knowledge is a competent Fellow.

MEDALS DISTRIBUTED BY THE PARIS SOCIÉTÉ DE GÉOGRAPHIE.—The great gold medal of the Paris Geographical Society has been awarded to Commandant Monteil for his remarkable journey from Senegal to Tripoli by way of Lake Tchad in 1890–1892.

The other medals adjudged are: The Erhard gold medal, to Messrs. Cabrisy, Blanc and Petit, for relief maps; the Laroquette gold medal to Fridtjof Nansen, for the crossing of Greenland, 1888; the Léon Dewez gold medal to M. J. Dybowski, for his journey from Loango to the Shari river, 1891–1892; the Malte-Brun gold medal to M. C. Lenthéric, for his volume entitled *Le Rhône, Histoire d'un Fleuve*, 1892; the Alphonse de Montherot silver medal to M. A. A. Fauvel, for his work on the province of Shan-Tung; the Louise Bourbonnaud gold medal to M. Teisserenc de Bort, for his travels in the Sahara, 1883–1890; the Charles Grad silver medal to Count de Saint Saud, for his studies on the Pyrenees, 1877–1892; and the Pierre-Félix Fournier prize to M. G. Capus, for his travels in Central Asia and his work, *À travers le Royaume de Tamerlan.*

THE MEDALS OF THE BERLIN GESELLSCHAFT FÜR ERDKUNDE.—The Humboldt gold Medal of the Berlin Geographical Society has been bestowed this year upon Dr. John Murray, of the *Challenger* scientific staff.

Two African explorers, Dr. Franz Stuhlmann and Dr. Oskar Baumann, received at the same time the honor of the Karl Ritter Medal; the former for his ample and exact observations in Central Africa made in association with Emin Pasha; the latter for his remarkable journeys and explorations in the Congo State and the island of Fernando Po and in the lake regions of the continent.

MOUNTAIN RESERVOIRS IN ALSACE.—Under this heading the London *Times*, of May 15, publishes the following information, condensed from an article in the *Economiste Français:*

One of the first undertakings was to regulate the two lakes in the valley of Orbey, known as the Black Lake and the White Lake, these two now holding 3,000,000 cubic metres of water, so that the cotton and other factories in the valley of Orbey are now able to work all the year round, and there is a constant irrigation of the pastures. The total cost did not exceed £3,000, and the annual expenditure is only about £160. A second reservoir was constructed near Sewen, in the valley of Masseraux, not far from the celebrated mountain pass known as the Ballon d'Alsace. This reservoir, surrounded by a wall nearly 90 feet high, contains 1,100,000 cubic metres of water, and is considered such a fine piece of work that a relief plan of it has been sent to the Chicago Exhibition. In 1890 a reservoir was built at Allenweier, in order to regulate the waters of the Fecht, a torrent which has at various times done great damage; and this reservoir, together with three small lakes, also in the valley of Münster, holds about 2,000,000 cubic metres. The latest work, commenced last year, was the transformation of the Lauch, in the valley of Guebwiller, into an artificial lake large enough to hold the rain water which comes down from the surrounding heights and to store it until it is required. This reservoir will have an area of 28 acres and will hold 800,000 cubic metres of water, and, as it is fed by rain water from a surface of over 1,200 acres, as much as 3½ million of cubic metres will be collected in the course of the year—that is, when there is an average rainfall. The cost of construction is estimated at £43,250, of which all but £6,000, contributed by the town of Guebwiller

and the factory owners of the valley, is found by the State. The reservoir will be finished next year, and will provide motive power for 30 factories and irrigate 4,000 acres of pasture.

A SPECIAL POLITICAL MAP OF ITALY,* showing the civil, military and ecclesiastical divisions and subdivisions of the country, with explanatory text, has been published by the Istituto Cartografico Italiano of Rome.

It forms an atlas of 20 sheets, each about 20 inches square, drawn to a scale of 1:500,000, and colored with singular delicacy and good taste.

Notwithstanding the apparent limitations of the title, the map is useful for general reference, though it must be remembered that the longitudes are calculated from the meridian of Rome.

THE CORINTH CANAL.—The canal across the Isthmus of Corinth was to be formally opened at the end of June. The work was begun in 1882, one of many enterprises that followed in the wake of the Panama project. The canal unites the Gulf of Corinth with the Gulf of Ægina, and makes a true island of the Peloponnesus. It is 4 miles in length, 72 feet wide, and 26 feet in depth.

The British Consul at Patras in his last report says:

It will prove of great benefit to the various ports in the vicinity, for steamship companies trading with Constantinople, the Black Sea, Asia Minor, and the Ægean

* Carta Politica Speciale del Regno d' Italia, colla Indicazione delle Circoscrizioni Amministrative (comprese quelle dei singoli Comuni) e delle Nuove Circoscrizioni dei Mandamenti e dei Collegi Elettorali e colle Tabelle di altre importanti Circoscrizioni Territoriali.

Sulla Scala di 1:500,000.

Costruita e disegnata da G. E. Fritzsche su dati riveduti da L. Grimaldi Casta della Direzione Generale di Statistica.

Eseguita e publicata dall' Istituto Cartografico Italiano.

Prezzo L. 25. Roma, 1893.

Archipelago have announced their intention of passing their steamers through the canal, and this will afford the passengers the satisfaction of a sail through the Gulf of Corinth and the Saronic Gulf, both of which are very beautiful and crowded with points of interest. Passengers landing at Patras can visit Olympia and rejoin their ship the next day. At Itea, in the Gulf of Salona, they are within a few hours' walk of the site of Delphi, where excavations are being carried on by the French Archæological School, and whence the ascent of Parnassus can easily be accomplished in the autumn and summer. At Corinth the site of the old town and Acrocorinth, whence a lovely view is obtained, may be visited in a few hours. Shipping generally will benefit by the opening of the canal, for the gulf and its approaches are at present very badly lighted, and it will be necessary, of course, to facilitate the passage of steamers at all seasons and hours, and to place lights at the various dangerous points.

Severe Frost at Hongkong.—Under this heading *Nature*, for April 6, 1893, publishes some correspondence on the cold weather experienced at Hongkong in January last. The latitude is 22° 16′ 30″ N., and the mean temperature for the winter months is 66° Fahr.

January 15, the temperature fell at the Botanic Gardens, 350 feet above sea-level, to 39°, on the 16th to 35°, and on the 17th to 31°. At Canton, on the 16th, the thermometer stood at 25°. On the peninsula of Kowloon, opposite to Victoria, the cold seems to have been greater than at Hongkong; ice was seen on pools of water within fifty feet of sea-level and at the Kowloon Docks there was ice at the bottom of an empty dock. The rigging of ships in the harbor was coated with ice; and on Victoria Peak, 1818 feet above the sea, a casing of perfectly transparent solid ice, $5\frac{1}{2}$ inches in circumference, formed on the blades and bents of grass. This was on the windward side of the hill, but even on the lee side, the coating was about 3 inches in circumference. Evergreen shrubs and trees carried on their leaves solid coverings of ice $\frac{3}{8}$ of an inch in thickness. Many of the limbs snapped off under the

weight; and the accumulation of ice broke down many of the telephone wires.

Many of the plants in the Gardens were injured and not a few were killed.

Mr. Thiselton-Dyer, of the Royal Gardens, Kew, makes the following remarks:

The importance of such facts as these in connection with geographical distribution can hardly be overrated. It is customary to compare the range of a plant with the corresponding mean annual temperature. But it is obvious that the exterminating effect of occasional low temperature must override every other condition. An island is often the last refuge of a species not found elsewhere. Such a frost as occurred in Hongkong would erase the Double Cocoa-nut in all probability from the face of creation, if it occurred in the Seychelles.* In any case islands are not easily restocked except with littoral vegetations and the trees distributed by carpophagous birds. It seems evident therefore that the geographical distribution of plants may still be influenced by causes which are catastrophic in their nature.

DELCOMMUNE'S EXPEDITION.—The following telegram supplements the information contained in those published in the BULLETIN for March, p. 167:

LISBON, April 11, 1893.

. . . . The Luapula is the principal branch of the Congo. The Lualaba is an affluent; it enters the Luapula at Ankorro. The Lukuga joins the river below that point; as an outlet of the Tanganika it has no importance, and it is not navigable. Lake Lanji does not exist. Crossed the Congo between Ankorro and the confluence with the Lukuga. Up stream as far as Lake Kassali, and beyond it, the river is completely open; down stream, there are some rapids. . . .—DELCOMMUNE.

According to *Le Mouvement Géographique*, M. Delcommune gave fuller details of his exploration at a meeting, held in Brussels, April 20. He said: "We have studied more than 300 kilomètres (186 miles) of the course of the Lomami previously unknown. We discovered Lake Kassali, and traced the Lufira river, which is interrupted by numerous rapids, and also the intricate course of the upper Lualaba with its impassa-

* Between 4° and 5°, S. Latitude.

ble rapids at Nzilo, where we abandoned the 27 boats which had cost us two months' toil. After a stay at Bunkeia, we pushed on to the Tanganika, passing by Lake Moero. We then solved the problem of the Lukuga, which is the outlet of the great African lake (Tanganika is meant), and settled the fact that Lake Lanji does not exist. We ascended the Congo as far as the junction of the two great streams, the Luapula and the Lualaba, and satisfied ourselves by several observations that the former, which passes through Lakes Bangweolo and Moero, is the true Congo. The Luapula is not navigable where it leaves the Moero, but the Congo, from a little below the Lukuga to the Lualaba above Lake Upemba, is navigable for a length of more than 400 kilomètres (250 miles).

The results are: "That the shortest and safest route to the Tanganika is not that from the eastern coast, but the one by way of the Congo, passing by Bena-Lassambo, the terminus of steam navigation on the Sankuru. From this point a caravan would reach Albertville or Mpala, on the Tanganika, in 45 days.

"That a section of railway and a little work on the Lomami rapids would unite the Lomami and the Lualaba, which are separated at the proper point only by a distance of 80 kilomètres of level country.

"The regions traversed by the expedition were generally fertile, but unlike those of the upper and lower Congo in aspect, as well as in the flora and the fauna. In some places, such as Katanga, the population was sparse—the result of the slave trade—but on the Lukuga and the Lualaba, and in nearly all the vast territory of Baluba, it was of extraordinary density and

formed a vigorous and handsome race, secure in its strength against the raids of the slave hunters.

"This southern part of the Congo State, elevated as it is from 3000 to 5500 feet above the sea, enjoys an almost temperate climate, with a dry air and a constant breeze."

THE MAISTRE EXPEDITION.—*The Bulletin du Comité de l'Afrique Française* for June contains M. Maistre's report of his march from Kemo on the Ubangi river northward to Bagirmi, thence westward along the course of the Benue to the Niger, which was followed to Akassa, where the great river enters the Gulf of Guinea.

The party consisted of: MM. Maistre, Brunache, Clozel, Briquez, de Béhagle and Bonnel de Maisières, an escort of 60 Senegalese, and 115 carriers; in all, 181 persons.

Kemo was left June 29, 1892. The tribes first encountered, the Togbos and the Ndris, were friendly, and treaties were made with the Ndri chiefs. Soon after leaving their country, the guides deserted, and the march was continued by the compass through an uninhabited region covered with a dense growth of tall grasses.

On the ninth day a Mandjia village was seen; but the Senegalese scouts were received, on approaching, with a flight of arrows and assagais from an enemy, hidden in the tall grass. The column pushed on to the village, where efforts were made to parley with the enemy, but in vain. The natives abandoned their huts, leaving abundant provisions behind them, and carrying

the report that the whites had come to make war on the Mandjia. This hostile feeling was encountered for a month. At Bogada, about 125 miles north of Kemo, the Mandjia came to a conference and peace was made. Guides were furnished and on the 2d of September the party reached the Gribingi river, one of the eastern branches of the Shari. Following the right bank of the Gribingi through a marshy country inhabited by the friendly Akunga tribe, the expedition came to the Aretu, a people whose language was wholly unknown to the interpreters. At Mandjatezze, about 8° 39′ N. Lat., the direction of the route was changed to the left toward the Sara country and Nachtigal's line of march, and for the next fifteen days difficulties of every sort multiplied.

The guides deserted, the food gave out, and the men had to live on the roots and the leaves. Weak as they were they had to keep on, sometimes up to the neck in the water of the swamps. At Kasinda, about 50 miles west of Mandjatezze, it was hoped that the men might rest; but the natives showed hostility, and the march was resumed. After five days Garenki was reached. This village is on an island in the Bahar-Sara, which M. Maistre supposes to be a southern arm, or rather an affluent, of the Shari. The language of the people (the Sara) was still unintelligible, but at Gako some Mussulmans from Bagirmi were met, who spoke Arabic, and M. Brunache was able to talk with them. One of these Mussulmans, Si-Saïd, was an envoy from Bagirmi to the Sara peoples and his friendship was of the greatest service to the expedition. On the 21st of November, after crossing a very dry country, in which

the only water was drawn from deep wells sunk in the sand, M. Maistre and his party arrived at Laï, the residence of the King of the Gaberi. This town, with a population of 10,000, is situated on the right bank of the Logone, or Ba-Baï river.

The strangers were coldly received at first, but the chief soon became friendly and signed a treaty with them, in the hope, it was found, of inducing them to join him in an attack upon his neighbors. For two days the Frenchmen were escorted by a force of 2000 warriors; but M. Maistre refused to assist them, and continued his route. He was at first kindly received at the next village, and then suddenly attacked. The village was burned to punish this treachery, and the line of march was changed for some days. The wide plains of the Sudan gave place to broad plateaux, which form the dividing line between the waters of the Lake Tchad basin and those of the Benue. Near Tune village, in Laka, M. Clozel fell sick and a long halt became necessary. This was in December, and the march had hardly been resumed when M. Maistre's illness interrupted it for two weeks.* Soon after the party was joined by

* The Europeans in the Maistre Expedition were no more than a working force, but their experience emphasizes Lieut. Morgen's argument in his manual for the Conduct of War and Expeditions in Africa. He says:- "So far as the number of Europeans is concerned—I speak here, as I do farther on, rather of a political or exploring expedition sent out for a long time than of a military expedition organized for a brief period in order to inflict chastisement—it can never be small enough. This sounds absurd, but it is unquestionably right. An expedition is sufficiently provided with Europeans if its conduct is made secure under all circumstances. The more white men the more luggage, and the greater the burden on the commander. The Europeans sicken much more easily than the blacks and must be much more carefully tended. I cannot leave a sick European, at least not in West Africa with its poor communications, even in the care of a friendly chief. The whole expedition must wait till the sick man can be moved, and

a caravan of Fulbe merchants returning to Yola, which was reached without accident. At that place the agent of the Royal Niger Company furnished supplies and transportation to Akassa.

The route followed by M. Maistre cuts in two, as he says, the greatest blank space on the map of Africa.

He refers to a mountain mass in the Bolo country, eight days' march to the west of Amazaga, as the probable source of several rivers: the Tomi, an affluent of the Kemo, from the right, the Nana and the Bahar Sara, which flow to the north, the Ombela, an affluent of the Ubangi, and perhaps, also, some affluent of the Sanga. The Gribingi, previously unknown, has been carefully mapped for more than 60 miles, and M.

---

even then he must be carried by at least four men, who could be better employed. In a word, too many white men are no help, but a hindrance, to the expedition.

Was nun die Anzahl der Europäer betrifft, so kann dieselbe—ich spreche hier, wie im Folgenden mehr von einer auf längere Zeit ausgesandten politischen oder Forschungs-Expedition, als von der nur für kurze Zeit zusammengestellten militärischen Straf-Expedition—nie klein genug sein. Dies klingt absurd, aber ist ohne Frage richtig.

Wenn nur die Führung der Expedition unter allen Umständen gesichert ist, dann ist sie auch genügend mit Europäern besetzt. Je mehr Weisse, desto mehr Gepäcklasten, aber auch desto mehr andere Last erwächst dem Führer. Die Europäer erkranken leichter, als die Schwarzen, und müssen viel rücksichtsvoller behandelt werden. Den erkrankten Europäer kann ich nicht—wenigstens nicht in West-Afrika bei den schlechten Verbindungen—selbst bei einem befreundeten Häuptling, zur Pflege zurücklassen.

Die ganze Expedition muss warten, bis derselbe wieder transportfähig ist, und schliesslich gebraucht man zur Tragen des Kranken mindestens vier Leute, die besser zu verwenden wären. Kurz und gut, zu viel Weisse sind keine Unterstützung, sondern ein *impedimentum* der Expedition.

pp. 19-20, *Kriegs-und Expeditionsführung in Afrika, von C. Morgen, Premier-Lieutenant, a. l. s. d.* 4. *O/S Inf.-Reg. Nr.* 63, *Komm. zum Auswärtigen Amt. Berlin*, 1893.

In Lieut. Morgen's opipion, three Europeans suffice for a party composed of 30 soldiers and 120 carriers.

Maistre believes it to be a branch of the Shari; its course is nearly parallel with that of the Ba Mingi, a river mentioned by the natives, and the two meet a little to the north of Mandjatezze. M. Maistre is inclined to identify the Ba Mingi with Nachtigal's Bahr el Abiad, and the Gribingi with his Bahr el Azrek. (These Arab names, he notes, are unknown in the country). MM. Brunache and Briquez, who were with the Dybowski expedition, suggest that the Kukuru river crossed by that expedition may be the Gribingi.

The Bahar Sara, flowing from the south to the north, is identified with the Bahar Kuti of Nachtigal; but M. Maistre, from information given by the natives, supposes that this river, instead of flowing from the east, is in its upper course almost parallel with the meridian, and has its source in about 6° N. Lat.

M. Maistre finds it impossible to speak with certainty concerning the communication between the Shari and the Logone, of which the natives made report to Barth and Nachtigal; but he does not believe in its existence, "having little faith *à priori* in two rivers communicating with each other." The skepticism is reasonable, in spite of the Cassiquiari river; but M. Maistre quotes the statement of the natives that the Bahar Nam, a swamp which the expedition crossed at Gako, establishes a communication at times of flood between the Bahar Sara and the Logone by Bangul, to the south of Laï. He admits the possibility of a water passage at such times, but denies the river connexion.

Beyond the Logone the expedition determined the western limit of the Lake Tchad basin.

The information furnished by the natives went to

show that the Mayo Kebbi does not issue from the Tuburi marsh, as Barth was ready to admit; and in this case there can be no communication between the Benue and the Logone.

At Palem the expedition touched the route followed by Nachtigal and so united the Congo with the regions of Northern Africa.

The tribes encountered were (going North and then West): the Togbos, comparatively unimportant; the Ndris, a strong tribe, occupying a broad band of country parallel with the Ubangi; the Mandjia, very numerous and much more powerful than the Ndris and, at the same time, suspicious and of low intelligence; the Wia-Wia and the Awaka, both resembling the Mandjia, though more intelligent and more tractable; the Akunga, on the right bank of the Gribingi where it turns abruptly to the north, a fine race, much superior mentally and physically to those already named; the Aretu, in the country between the Ba Mingi and the Gribingi and on the left bank of the latter; the great Sara tribe, whose country begins at Mandjatezze. Physically the Saras are the finest men M. Maistre had seen in Africa, with an average stature, according to measurement, of 1.78 metres (5 feet 10 inches). They are very warlike. Those settled farther north pay tribute to the king of Bagirmi, but the others have repelled all the attacks of the Mussulmans and preserve their independence. Next beyond the Saras are the Tummok, subject to Bagirmi, and apparently ruined by war. Palem and Gundi, important places in Nachtigal's day, are almost destroyed. The Gaberi occupy both banks of the Logone. They are excellent

horsemen and fighters, who have held their own against Bagirmi. Their chief town is Laï, on the right bank of the river. The tribes farther to the west are few and small, the most important being those of Laka, to the south of Tuburi and Lame.

EMIN PASHA.—The Brussels papers published at the end of May the following letter, written by the Arab Resident at Stanley Falls to his uncle Tipu Tip at Zanzibar:

"Saïd-ben-Abed set out from Kirondo to meet between Unyoro and Wadelai one of his slaves named Kironga-Ronga, who had bought a great deal of ivory, when he encountered Emin Pasha, who was on the march against him.

They fought for two days; the third day Emin was defeated, and beat a retreat after losing a good many of his people. The fourth day Saïd-ben-Abed's men went in pursuit of Emin and overtook him, and they fought again. Emin was taken and killed, with his whole force, and there can be none of his men remaining but those he may have left at Wadelai, or elsewhere."

This letter is dated Dec. 3, 1892, and there is little reason to doubt its substantial correctness.

Ten years ago the rising in the Sudan cut off the communication between Emin Bey, then Governor of the Egyptian Equatorial Provinces, and the authorities at Cairo. For three years Emin was lost to the world, as if he were in another planet. Then came the news of his beleaguered position at Wadelai, the movement for his relief, the expedition of Stanley, the forced rescue, and the entrance of Emin into the German service and, with this, the general loss of interest in his career. Like Stanley, he seemed to have done his work, and men busied themselves with him no more; but his figure remains one of the most striking in the story of African adventure.

REMARKABLE RAINS.—Mr. Clement L. Wragge, Government Meteorologist of Queensland, writes to *Nature*, of May 4, some particulars of the extraordinary rainfall at Crohamhurst, on the western slope of Mont Blanc, a peak on a spur of the D'Aguilar Range, South Eastern Queensland.

The approximate latitude and longitude are : 26° 50′ S. Lat., 152° 55′ E. Long.

There fell at Crohamhurst for the 24 hours ending 9 A.M., February 1, 1893, 10.775 inches rain ; February 2, 20.056 inches ; February 3, 35.714 inches ; February 4, 10.760 inches.

Mr Wragge believes that the fall on the 3d of February "beats the world's record."

Mr. E. Douglas Archibald, in a communication to the same journal for May 25, recalls the fact that the heaviest known rainfall for 24 hours is that which occurred on the 14th of June, 1876, at Chirapunji, in the Khasia hills, Assam, when 40.8 inches fell ; and for the four days, June 12–15, there were 102 inches.

The *Imperial Gazetteer* of India, 2d. Ed., Vol. VIII, p. 179, says :

"The rainfall at Cherra Púnji is enormous. The average during the 25 years ending 1881 is returned at 489 inches ; and 805 inches are said to have fallen in 1861, including 366 inches in the single month of July. At Shillong, where the clouds rolling up from the plains of Bengal have already spent their force on three intervening ridges, the annual rainfall declines to an average of about 88 inches ; and at Jowái, which occupies an intermediate position, the average is 362 inches. The rainy season is confined to the five months from May to November."

A Crossing of Australia.—*Nature*, of May 11, reports that Mr. Guy Boothby has lately crossed Australia from north to south, starting from Normanton, on the Gulf of Carpentaria, in March, 1892, and arriving at Adelaide about a year after. He travelled on horseback or in a wagon to Bourke, in South Australia, thence in a boat down the Darling and in a river steamer to Morgan, where he took the railway to Adelaide.

The feat is sufficiently rare to be worthy of record.

Discoveries in the Chatham Islands.— Mr. H. O. Forbes, in an article on The Chatham Islands and their Story (in the *Fortnightly Review* for May), mentions, among other discoveries made by him, the proof that there recently existed in these islands two birds, the nearest allies of which inhabited the Mascarene Islands within the historical period. These birds are a flightless rail allied to the Mauritius *Aphanapteryx*, and a coot which hardly differs from the extinct *Fulica Newtoni*.

The Chatham Islands lie about 400 miles east of New Zealand; the Mascarene Islands (Réunion, Mauritius, etc.) nearly 600 miles east of Madagascar. The groups are separated by more than twenty degrees of latitude and by 120 degrees of longitude; about the distance from London to San Francisco.

Mr. Forbes agrees with Prof. Newton in the belief that there was once a time when Rodriguez, Mauritius, Bourbon, Madagascar and the Seychelles were connected by dry land; and he argues from the existence of the birds discovered that the ancient land comprising New Zealand and its neighboring islands must have been united with the one far to the west-

ward. The connecting body is supposed to have been the Antarctic Continent; and when the ice age came on the inhabitants must have migrated northwards.

In this way Mr. Forbes explains the appearance of the genus *Aphanapteryx* in regions so far apart as Mauritius and the Chatham Islands.

Mr. Alfred Russel Wallace writes to *Nature*, of May 11, to combat this "tremendous hypothesis" which is, he maintains, inadequate to explain the facts. Small, flightless birds, he says, must have been developed in or near to the islands where they are now found, since they could not have arisen on any extensive land inhabited by carnivorous mammals and reptiles, and could not long survive if introduced into such a country. Allied forms of ancestral flying birds could have reached the islands and there, owing to the total absence of terrestrial enemies and the abundance of food. developed into the allied flightless birds.

This explanation Mr. Wallace holds to be much more satisfactory than that which requires for a basis the supposition of enormous changes in physical geography.

Mr. Forbes replies to these objections in *Nature*, of May 25. He says that Mr. Wallace has himself pointed out that it requires a land connection to explain the presence of the flightless *Notornis* and *Ocydromus* in two groups of islands in the New Zealand region, for it has been hitherto considered an axiom of geographical distribution that the regions inhabited by the same genus or species have been continuous, or have been, at all events, such as to afford possibilities of migration from one to another. If *Aphanapteryx*

could have spread from the Chatham Islands to Mauritius by flight, *Notornis* and *Ocydromus* did not require a land connection to reach the nearer outlying islands from New Zealand, for they may equally have lost the use of their wings after they reached their present homes.

Mr. Forbes affirms that the world-wide distribution of the rails is due, not improbably, to habits which enable them to escape destruction. They live in reed and rush brakes, and the dense vegetation surrounding marshes, amid which pursuit is difficult or impossible. When in the Chatham Islands Mr. Forbes wished to secure a specimen of the *Ortygometra tabuensis*, which inhabits the dense rush-like vegetation of the upland districts of Warekawù. He succeeded only after two days' hard work, with the aid of a dog well trained to pursue this rail. Many birds were started, but they escaped, though none took wing. It is a question, however, whether the gigantic *Notornis* could have escaped under similar conditions.

Persistence in living under persecution depends largely, as Mr. Forbes says, on the numbers in which an animal is reproduced; and he holds to the theory that a land of extensive dimensions existed in the southern seas, in order to explain the distribution of plants and animals, *unknown on the northern side of the equator*, in regions so distant (from each other) as South America, Australia, New Zealand, and Lemuria (the ancient land of which Madagascar, Mauritius, Réunion, Rodriguez, and the Seychelles are the fragments).

The Royal Society of New South Wales.—*Original Researches.* The Royal Society of New South

Wales offers its Medal and £25 for the best communication (provided it be of sufficient merit) containing the results of original research or observation upon each of the following subjects:—

SERIES XII.—To be sent in not later than 1st May, 1893. No. 40.—Upon the Weapons, Utensils, and Manufactures of the Aborigines of Australia and Tasmania. No. 41.—On the Effect of the Australian Climate upon the Physical Development of the Australian-born Population. No. 42.—On the Injuries occasioned by Insect Pests upon Introduced Trees.

SERIES XIII.—To be sent in not later than 1st May, 1894. No. 43.—On the Timbers of New South Wales, with special reference to their fitness for use in construction, manufactures, and other similar purposes. No. 44.—On the Raised Sea-beaches and Kitchen Middens on the Coast of New South Wales. No. 45.—On the Aboriginal Rock Carvings and Paintings in New South Wales.

SERIES XIV.—To be sent in not later than 1st May, 1895. No. 46.—On the Silver Ore Deposits of New South Wales. No 47.—On the physiological action of the poison of any Australian Snake, Spider or Tick. No. 48.—On the Chemistry of the Australian Gums and Resins.

The competition is in no way confined to Members of the Society, nor to residents in Australia, but is open to all without any restriction whatever, excepting that a Prize will not be awarded to a Member of the Council for the time being; neither will an award be made for a mere compilation, however meritorious in its way. The communication, to be successful, must be either

wholly or in part the result of original observation or research on the part of the Contributor.

The Society is fully sensible that the money value of the Prize will not repay an investigator for the expenditure of his time and labor, but it is hoped that the honor will be regarded as a sufficient inducement and reward.

The successful papers will be published in the Society's Annual Volume. Fifty reprint copies will be furnished to the Author free of expense.

Competitors are requested to write upon foolscap paper—on one side only. A motto must be used instead of the writer's name, and each paper must be accompanied by a sealed envelope bearing the motto outside, and containing the writer's name and address inside.

All communications to be addressed to the Honorary Secretaries.

F. B. KYNGDON,
T. P. ANDERSON STUART, } *Hon. Secs.*

THE SOCIETY'S HOUSE, 5 Elizabeth Street,
Sydney, 14th December, 1892.

AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—This Association has been in existence since 1888, and has held four meetings; at Sydney in 1888, at Melbourne in 1890, at Christchurch in 1891, and at Hobart in 1892.

The next meeting will be at Adelaide, South Australia, September 25, 1893, and will continue for a week.

The Association prints a large proportion of the

papers presented at the meetings, in a volume containing about 600 pages. Each member receives a copy.

There will be excursions to places of interest, and other entertainments; and the time of year fixed for the next meeting is most favorable for a visit to South Australia.

Communications should be addressed to the Hon. Secretaries, The University, Adelaide.

WASHINGTON LETTER.

WASHINGTON, June 15, 1893.

THE SMITHSONIAN INSTITUTION.—Professor Langley in his last annual report stated: "That the Smithsonian Institution is, by reason of its far-reaching connection with the scientific world, enabled to make specially effective use of sums given for immediate employment in specific purposes or investigations," and he felt assured that, were the intentions of the Regents better understood in this regard, the Institution would much more frequently be made the medium for giving effect to the plans of those interested in promoting specific researches, as well as in making permanent endowments.

The total permanent Smithsonian fund is now nearly $1,000,000.

The Smithsonian Astro-physical observatory is still occupying temporary shelter. The money given to the Institution for the erection of a permanent building is held while awaiting the action of Congress in providing a site. In the report already referred to, the new branch of astronomy known as astro-physics is very concisely set forth. Its purpose is distinctly different from that of finding the places of the stars, or the moon, or the sun. Says Prof. Langley: "The distinct object of astro-physics is, in the case of the sun, for example, not to mark its exact place in the sky, but to find out how it affects the earth and the wants of man on it; how its heat is distributed, and how it in

fact affects not only the seasons and the farmers' crops, but the whole system of living things on the earth, for it has lately been proven that, in a physical sense, it, and almost it alone, literally first creates and then modifies them in almost every possible way. We have, however, arrived at a knowledge that it does so, without yet knowing, in most cases, how it does so, and we are sure of the great importance of this last acquisition, while still largely in ignorance how to obtain it."

The meteorological and physical tables originally prepared by Dr. Guyot, and first published in 1851, have passed through four editions, the last of which was exhausted several years ago. In preparing a fifth edition it was determined to conform the tables to the present state of our knowledge. This has been done with the aid of Prof. William Libbey, Jr., of Princeton, and Mr. G. E. Curtis of the Smithsonian Institution. The work will be hereafter known as the Smithsonian Tables.

Prof. Langley, on behalf of the Smithsonian Institution, has secured for a term of years a table at the famous zoölogical station at Naples for the use of American investigators in marine biology. And, as an advisory committee to aid him in the selection of candidates for the privilege of using the table, he has appointed Dr. J. S. Billings, U. S. A., Prof. E. D. Wilson, of Columbia College, Prof. J. A. Rider, of the University of Pennsylvania, and Dr. C. W. Childs, of the Department of Agriculture.

This Station is the greatest centre of biological research in Europe, and most important for advanced students and investigators. Although the tables as

they are termed, have been in existence for twenty years, this is the first time one has been secured by any American institution. The action of the Smithsonian in thus providing free access to advantages so eagerly sought from all quarters cannot therefore be too highly commended.

HYDROGRAPHIC OFFICE.—Lieutenant Commander Richardson Clover has been relieved of duty as Hydrographer, U. S. Navy Department, and granted several months' leave of absence, at the end of which time he expects to be placed on sea duty.

Commander Charles D. Sigsbee has been designated U. S. Hydrographer. A better selection could not have been made. Aside from the fact that he has twice already been connected with this office (in 1873-74, and again in 1878-82) he rendered while attached to the Coast Survey (1874-78), in charge of the S. S. *Blake*, most important service in developing, if not creating, new methods in deep-sea sounding and dredging. By means of the method he invented and put in operation on board the *Blake*, deep-sea work became nearly as ready of accomplishment as ordinary littoral soundings. A description of his instruments and their application was published in 1880. In consideration of the value of these improved methods and appliances he was awarded a decoration by the Emperor of Germany. Commander Sigsbee has been on sea duty fifteen years, and on land duty sixteen years—most of the latter at the U. S. Naval Academy.

THE FISH COMMISSION'S hydrographic survey of the North Pacific region begun by the steamer *Albatross*

under Commander Tanner in 1888 has been completed between the Straits of Juan de Fuca and the Mexican boundary line. By this survey the contour of the continental border has been developed from the shore line into depths of 200 fathoms as far south as Point Concepcion, the region between the latter place and San Diego having been previously explored. A great wealth of hydrographic information of value to navigation has been obtained. A careful series of temperature and density, as well as biological observations in different parts of San Francisco Bay by Mr. C. H. Townsend, the naturalist of the *Albatross*, seems to indicate that the waters of that region are not, as has hitherto been supposed, unsuited to the breeding of Atlantic coast oysters. Dr. Bashford Dean, of Columbia College, N. Y., an expert on the subject of oyster-grounds, has been commissioned to study the methods of oyster-culture now practised in European countries, and to prepare an illustrated series of reports regarding these matters.

MARINE METEOROLOGY.—The effect of barometric pressure on ocean currents is a matter of discussion among meteorologists. Lieut. J. E. Pillsbury's observations in 1886 in the Gulf Stream clearly show the influence of barometric observations. The June *Pilot Chart* displays on two small charts a comprehensive and instructive presentation of the ocean current system of the North Atlantic, and the curves of average equal barometric pressure. While these present no new discoveries, they give new light, and will lead to observations for practical consideration of facts regarding the

barometer, which has not heretofore received the attention that it should, and it is hoped through these practical observations that beneficial results will accrue both to commerce and the science of meteorology. The Hydrographic Office invites careful observations on the extent to which the barometric pressure is a factor in influencing ocean currents. Comparing the blue wind arrows on the main Pilot Chart with the small barometer chart and the small current chart, a striking similarity appears between the curves, showing equal barometer pressure, directions of the winds, and general directions of the ocean currents. Among the causes which operate to produce and influence the winds and currents, this comparison suggests that the varying barometer pressure may be one of the original causes as well as a final influence on the direction of the currents, directly by its varying pressure, as well as indirectly through its relations to the wind. The subject is one of growing importance.

Topographic Surveying.—The present stage of development in methods of topographic surveying is to be generously set forth in a manual, giving descriptions of the topographic work, instruments and methods used by the United States Geological Survey. The work will be accompanied by a collection of constants and tables used in the reduction of astronomical observations for position, of triangulation, of height measurements, and other operations connected with the making of topographic maps. While it is not intended as a general treatise on topographic work, it may to a certain extent supply the existing need of such a work.

Besides the valuable tables already referred to, it will contain an account of former and present surveys by the General Government, by States and by railroad companies.

The guarantee of the work is its author—Mr. Henry Gannett.

YELLOWSTONE PARK.—Mr. Gannett recently entertained the Geographic Society with personal reminiscences of the Yellowstone country at the time when the nearest settlements to the Park were one hundred miles away, and the nearest railroad was five hundred miles; when the express train was a Concord coach, and the ordinary conveyance was on horse or mule back; when the white and red man alike were wild, as well as all animal and vegetable life. He noticed the remarkable fact that when the first settlers, only a generation ago, came into Montana, and miners and prospectors flocked in rapidly and spread widely over the mountains in search of the yellow metal, they seem to have almost completely avoided the region now constituting the Yellowstone Park. And the same was the case with the early exploring expeditions. Lewis and Clarke passed to the north; the Pacific Railroad explorers avoided it, passing to the north and south, while Reynolds, in 1860, travelled all around it, without apparently being able to penetrate it. The reason, he said, was not difficult to discover. The area of the Park is a high, undulating forest-clad plateau, traversed by mountain ranges and groups. It is the highest land north of Colorado, lying at the sources of the Missouri and Snake rivers, and has a very severe

climate. Snow lies on it until summer, and commences to fall again in August. Frosts occur every month in the year. It is always either winter, or late in the fall. On the east it is separated from the rest of the country by a high, almost impassable mountain range, stretching from the head of Wind River to the bend of the Yellowstone, which effectually prevents access from that side.

Mr. Gannett dwelt on the legends and stories about the region, and on the wanderings and experiences of various exploring parties prior to the Government exploration under Dr. Hayden in 1869, which resulted in establishing the Yellowstone National Park by an Act of Congress, in the spring of 1872. He related a curious circumstance as to the location of the southern boundary of the Park. It is described in the act as "the meridian through a point fifteen miles west of the most westerly portion of Madison Lake." At this time the name Madison Lake was applied to what is now known as Shoshone Lake, as it was then supposed that the lake was the head of Madison River. The name Madison Lake is now applied to a little pond at the head of Madison River, which for half the year at least, is dry. A literal interpretation of the statute would place this boundary several miles west of its true position for the six months of the year during which the lake is in existence, while during the other six months, when it is dry, there would be no western boundary at all.

Mr. Gannett was in charge of the party which, in 1878, made the Government map of the Park reservation.

TEXAS.—At a recent meeting of the National Geographic Society, Mr. Robert T. Hill, of the U. S. Geological Survey, presented so strikingly the physical characteristics of Texas that he may be said to have increased our knowledge of the geography of a country that includes within its area about one-twelfth of the entire United States. This area is so great and diversified that it embodies the distinctive features of every part of the country. In length and breadth the state is about equal—750 by 750 miles. Said Mr. Hill, it is a humid state, an arid state, a forest, a prairie, a mountain, and a plains state. It is a southern state a central state, and a western state—everything but a northern state.

The great Atlantic timber belt region extends into and ends in Texas, occupying in the northeast corner an area as large as Virginia. This portion is known as East Texas. In southern Louisiana and Alabama a narrow strip of prairie begins to appear between the timber belt and the sea. This is cut by bayous, whose banks are the home of the magnolia, the cape jessamine, and the palmetto. It has its greatest development along the Texan coast, and it is called the Coast Prairie Region, occupying an area as large as the coast states of New England. The great plains of the Dakotas, Nebraska and Kansas can be followed into Texas, finding there in their southern end a country equal in area to Kansas. If the approach to the region is from the city of Mexico, Santa Fé, Salt Lake City, or any point on the great central basin which lies between the crests of the Cordilleras, known as the Great Basin Region, the truly arid country is found to con-

tinue into Texas with all its characteristic aspects. The crests of the Rocky Mountains can be followed southward from Colorado and New Mexico into Texas, between the Pecos and the Rio Grande. It may be said, therefore, that from a natural standpoint Texas embraces physical features belonging to the Great Atlantic Coastal Plain, to the Coast Prairies of Louisiana, to the Great Plains of the West, to the Rocky Mountain Region, and to the Plateau of Mexico or Great Basin Region.

But while the natural features of Texas are largely the continuation of some of the grander divisions of the United States, the region is also, to a certain extent, physically insulated from them all. Upon the east and northeast are the waters of the Gulf of Mexico, and the malarial swampy regions of the Red and Sabine Rivers. Upon the north is the Indian Territory, with the Ouachita range of mountains extending from east to west. Upon the west are the arid deserts of Eastern New Mexico, perhaps the least populated of any portion of the United States, while the Rio Grande on the south has until recently proven a political barrier as great as though it were an ocean. These physical peculiarities are natural barriers to familiar interstate intercourse.

In the heart of the state and extending across it are the Black and Grand Prairies, a vast body of country which has no counterpart on this continent, and which possesses the most fertile of American soils. The easternmost part (the Black Prairie) constitutes perhaps the largest body of arable land in America, every inch of its 40,000 square miles being capable of culti-

vation. The western part (the Grand Prairie) contains some of the most picturesque landscapes in the country. There is an escarpment making a sudden ascent from the Black to the Grand Prairie region, the altitude changing from 600 to 2000 feet within a few miles. West of the Grand Prairie region lies what is known as the Wichita country, with a wheat growing population producing sufficient cereals for the consumption of the entire population of the state and a surplus for exportation.

Another peculiar region in Texas is the southeastern corner, which, in the light of recent events, might be termed Garza-land. It is a triangular area of low, dry country along the Rio Grande, covered with a dense, prickly, scrubby vegetation, everything that has thorns —mesquite, cactus, and cats-claw—some of which grow to a height not tall enough for timber, and yet sufficiently high to conceal a man on horseback. This country, so well adapted for nomadism and concealment, has been the refuge for all disturbed spirits of both nationalities. It may be termed the birthplace of Mexican revolutions, and the home of border bandits, Mexican and American.

But this same region is the source of the enormous range cattle industry of this country. Some of the great ranches occupy areas of 900 square miles, and for years have supplied stock for all the northward country.

In the northwestern portion of the state is the country known as the Llano Estacado—The Plains. Practically, the region may be described as a vast oblong *mesa*, lying between the Pecos and the Canadian

Rivers, including an area equal to the size of Iowa. The level of the plain at the northwest corner rises to a height of over 1000 feet above the Canadian River. It is a vast area, unmarked by trees or shrubs. Its chief vegetation is the short mesquite or buffalo grass, which grows in great luxuriance, making the lands especially desirable for grazing purposes. Its peculiar feature is the utter absence of streams, but an abundant supply of water can be obtained throughout the plains at depths averaging some 200 feet. Twenty years ago this plain, except the narrow neck between Fort Concho and Fort Davis, was considered a *terra incognita*, which, for want of water, not even the hardiest traveller dared penetrate; but since the construction of the Texas Pacific, and the railroad between Denver and Fort Worth, a large population has poured in, and now one is scarcely out of sight of the tall windmills which are scattered over it from one end to the other. It is a remarkable fact that the negro race has not acquired any foothold in this new part of Texas.

Death Valley Exploration.—As a further contribution to the literature of the Death Valley expedition of 1891, Dr. C. Hart Merriam has prepared Part 2 of the report on results. It is a biological survey of Southern California, Southern Nevada, and parts of Arizona and Utah. It consists of special reports on birds, reptiles, batrachians, fishes, molluscs, insects, and the desert shrubs, cactuses and yuccas; and is accompanied by a list of localities. The writers of these reports in the order named are Dr. A. K. Fisher,

Stejneger, C. K. Gilbert, Riley, R. E. C. Stearns, Dr. Merriam, and T. S. Palmer. The consensus of opinions of these naturalists is that by means of the collections the science of biology has been materially advanced. Mr. Stejneger says that since the days of the great western expeditions, the Mexican boundary survey, the various Pacific railroad surveys, and Wheeler's survey west of the 100th meridian, no collection of North American reptiles and batrachians has been made equalling or even approaching that brought home by the Death Valley Expedition.

A map of the region traversed by the expedition exhibits an activity that must have tested the endurance of its members severely.

Part 1, comprising the itinerary, description of the region, discussion of life zones, and report on mammals, is not yet ready.

HAWAIIAN ISLANDS.—A well condensed summary of the latest reliable data concerning the Hawaiian Islands has been prepared in the Military Information Division of the Adjutant General's office "for the information of the army."

While the work adds little that is new to our knowledge of the region, the compilation of existing facts has been so skilfully made (by Captain George P. Scriven, Signal Corps, and Lieutenant J. Y. Mason Blunt, Fifth Cavalry) that we have in forty-three quarto pages an admirable and well digested description of the physical features, climate, diseases, etc., of the eight islands constituting the Hawaiian group. The individual characteristics of Oahu, Hawaii, Maui,

Kauai, Molokai, Lanai, Niihau, etc., are described; each as to its coast, interior, cities, towns, public buildings, manufactures, and publications, with general physical characteristics, soils, climates, earthquakes, etc. As might be expected, civil, political, and financial characteristics are set forth without bias. Methods of inland and foreign communication—roads, railroads, steam vessels, telegraph, telephones, postal service, and distances are described and charted. The strategic value of the islands and their geographic position are graphically indicated. There are also a general chart of the group and separate maps of Oahu, Hawaii, Maui, and Kauai. These islands, with Molokai, contain the bulk of the population as well as the chief industries. The climate is described as warm, but salubrious. In the shade it is never hot and seldom chilly. Major Dutton says there are almost as many climates as there are square leagues, but that relatively to human comfort the climate is perfection—the temperature varying from 55° to 75° in winter, and from 70° to 85° in the summer. Cold and hot "waves" and frost are unknown. About one-half of the population is native and half caste; the balance is largely Chinese and Japanese, interspersed with Americans, British, Germans, French, Portuguese, Norwegians, and Polynesians. Ninety-one per cent. of the trade is with the United States. All forms of religion are tolerated, but the Protestants and Roman Catholics are largely in the majority. Laws are modelled on those of the United States.

Congress was strenuously urged in 1891 to make provision for cable communication with these islands.

An appropriation for the purpose was lost in the conference (trading) Committee of the two Houses during the last hours of the session. But, simultaneously, provision was made for a series of "soundings to be made between San Francisco and Honolulu for the purpose of determining the practicability of laying a telegraph cable between these two points." The President directed the work to be done by the Navy Department. The steamer *Albatross* began to take deep-sea soundings in October, 1891, and by January, 1892, two lines had been run between Monterey Bay, California, and Honolulu. The *Albatross*, being required for special investigations in Bering Sea, was detached from the work in February, and the steamer *Thetis* was detailed to run a third line between Point Concepcion, California, and Hilo Bay, Hawaii. The work was prosecuted with all the care and accuracy that the means for modern deep-sea research afford. The results, prepared in the Hydrographic office of the Bureau of Navigation, have recently been given out.

The maps and observations present a good knowledge of the route, and establish the fact that the laying of the cable on almost any line between California and the Hawaiian Islands is practicable. A lane about 200 miles wide was developed, and the results seem to indicate the most favorable route to be a rhumb line between Monterey Bay and Honolulu. This line will require the smallest length of wire, and will pass over an even bottom favorable for the protection and preservation of the cable, avoiding submarine mountains. "The plan of the survey consisted in developing the bottom of the ocean by observations of the depth, the

character of the bottom soil, the temperature at the surface and bottom of the ocean, and the vertical distribution of temperature throughout the whole depth." The length of miles sounded was 6,785 miles. The distance steamed was 10,769 miles. The number of soundings was 874, taken at alternate intervals of ten and two miles along the great circle.

The magnificent physical hydrography developed in this interesting scientific investigation is the remarkable feature of the survey.

Within a very short distance from Salinas Landing a sudden depression of nearly 2000 feet in the ocean's bed is gradually increased to about 9000 feet at not more than fifteen miles from the coast. From this point the shelving continues on a more gradual scale until a comparatively level bottom is found at a depth of about 18,000 feet; and this great depth is continued to within a short distance of the Hawaiian Islands. At a distance of 570 miles from Monterey a mountain rises two miles and a half, or to within about 3000 feet of the surface of the ocean. A condition very similar was found 200 miles east of Honolulu. In both cases the water deepens quickly from the slopes, and the cable route, somewhat diverged, passes at the foot of the mountains.

Large colored charts represent profile views of the Pacific along a great circle of the earth between Salinas Landing and Honolulu; between Concepcion Point and Hilo Bay; and along a rhumb line between Salinas Landing and Honolulu. Also, a chart seven feet long represents in shades of blue and contour lines the bottom of the Pacific between California and the Hawaiian Islands.

The work of the Government will probably end with the survey. Private enterprise must construct and lay the cable. The plan and the best route have been mapped out. Whether a line merely connecting California with Honolulu would have enough business to make it immediately profitable is very doubtful. If extended to Japan or Australia the conditions would be vastly improved. But in view of the immense strategic importance of these islands, and the possible opening of the Nicaragua route, it is not likely that the great consummation will be long delayed.

ARGENTINE REPUBLIC.—A résumé of the condition of affairs in the Argentine Republic to the end of 1892 presents many gratifying aspects, in spite of the disastrous effects of the financial storm of 1890.

A new government came into power in October last, and since that time there has been an implied assurance that at least the peace of the country is safe. The national territories are all now organized under territorial government, and are generally in prosperous condition. The movement of progress has reached the mysterious regions of Tierra del Fuego, and it is said that the town of Usuaia, on the southern coast of that desolate country, is surrounded by pleasant gardens, while the Indians "converse in the English lan guage, and have put on the garb of civilization."

Railway construction has been advanced to a moderate extent. The railroad in which the whole world is interested—that projected across the Andes to connect the Atlantic and Pacific—has been finished as far as Rio Blanco, leaving a gap of about 20 miles to the

Chilian boundary. On the Chilian side rails now extend for 20 miles, but much work has been done beyond that point, and the materials for the whole line are on the ground. The tunnel drilling should be completed with the plant now ready in about three years. Work is progressing from twenty-two different headings at the same time, and it is expected that when the rails have reached the foot of the pass from both sides a large passenger and cattle traffic will be carried on. The journey from Buenos Aires to Valparaiso by sea takes about twelve days and costs about $200. By the railway it will take two days, at a cost of less than $60. The Royal Mail Steamship Company is booking passengers through to Valparaiso, tranporting passengers and luggage during the summer months (November to March) across the Andes.

The very large reduction in 1891 in the import of lumber, hardware, railway materials and combustibles (about $30,000,000) shows how seriously the progress of the country has been retarded by the misfortunes of the government. The trade with Great Britain fell back $32,000,000, and the commerce with the United States to the figures of twenty years ago. The figures for 1892 show some improvement.

CHINESE IMMIGRATION.—In Brazil the farmers are unable to procure sufficient help to carry on their business, and the best mode of introducing Chinese and Japanese laborers is the question now being discussed by the planters and speculators. It appears that the management of immigration is intrusted to companies, and one of these companies, at least, having fears that the Chinese will refuse to immigrate to this Republic

(!), has sent an agent to China to investigate the situation, and at present all eyes are turned to China. It is said that nothing will be left undone to make large additions of Chinese to the present population.

The Chinese land telegraph line has been joined to the Russian system. Messages can now be sent to any part of the world from any telegraph station in China. The only province not reached by telegraph is Yunnan, which still remains opposed to all foreign innovations.

PRIMITIVE SHIPS.—Mr. George H. Boehmer, long connected with the Smithsonian Institution, has published a study of prehistoric naval architecture in the north of Europe. His investigations and discoveries are mainly on the line of vessels which have been disclosed in excavations on the coasts of European countries. These boats have been discovered in many places.

The tribes inhabiting the British Islands at the time of the Roman invasion had, as might be expected from their proximity to water on every side, employed a species of boats—dugouts, capable of holding thirty or forty men. The contact of the invasion wrought improvement in these rude types.

Their Scandinavian neighbors were further advanced in the art of ship building, and instead of the primitive dugout, constructed built-up ships propelled by oars, so arranged as to be used in either direction without unshipping. Their prows were very high. Mr. Boehmer thinks that a navy of such ships must have been the growth of centuries before the Christian era. He claims that the numerous similarities between the ships

of ancient Greece and Rome and the remains of prehistoric ship-building in the north of Europe suggest a common origin, and he describes the more important points of similarity and dissimilarity. This ground is denied by many investigators, but Mr. Boehmer argues that the naval structures of Scandinavia indicate that the maritime explorations of the Phœnicians had a tendency to influence the ancient inhabitants of the north in the construction of their vessels. That the art taught the Phœnicians by the Egyptians may be traced to the Greeks, whose naval structures show a remarkable resemblance to those a thousand years older, and are produced in the Roman ships. There are contemporaneous accounts of the naval structures of these two nations, and the subject has been largely investigated and written upon during the last three and a half centuries, as shown by Dr. Emil Luebeck's bibliography in his *Seewesen der Griechen und Römer.*

Mr. Boehmer describes at length the dugout and ribbed boats and the evolutions of naval architecture of the Germanic people, the Saxons and the Scandinavians, citing authorities and illustrations very copiously.

To the custom of ship burial which was practised by the Scandinavians we owe most of the valued restorations of ancient naval structures. In accordance with this custom, the bodies of the prominent dead were taken to the ship that had been their home during life, and this, surrounded by their wealth, became their last resting-place. Two methods of burial existed; that of cremating the ship, together with its sepulchred inhabitants, and one in which a mound was erected over the ship and the dead. It is to the latter method that we

are indebted for some well preserved ships which extend our knowledge of prehistoric ship-building. Several notable excavations of ships buried for centuries have been made within a very recent period. These and others less known are minutely described and illustrated in Mr. Boehmer's admirable work.

From some boats exhumed in the duchy of Schleswig, which were of the type in use from 30 B.C. to 224 A.D., the use of the word starboard as applied to the right side of a ship is traced. These boats were propelled by oars and steered by means of an oar tied to a cushion of wood, fastened to the right side of the vessel. It was then called the "stearboard," and the evolution to the present term is simple.

Mr. Boehmer's work evinces great learning and much industry. It must be regarded as an important addition to the literature of prehistoric times.

H.